

**HIWIN**<sup>®</sup>

Motion Control & Systems



## Linear Motors

& Distance Measuring Systems



## Motors, Drives & Accessories

### Linear Motors & Distance Measuring Systems

Alongside complete linear motor axes and linear motor axis systems, HIWIN also offers individual linear motor components for customised axis design. The linear motors consist of the primary part (forcer) with motor windings, and magnet tracks (stators) with permanent magnets. By combining several stators, travel distances of any length can be created. Similarly, several forcers can be operated on one linear motor axis. These can either be independently controlled on the axis, or be connected in parallel to increase feed power.

# Linear Motors & Distance Measuring Systems

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# Linear Motors & Distance Measuring Systems

Product overview

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## 1. Product overview

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HIWIN LMSA linear motors – “The compact power pack”

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- Optimised for highest power density
- Extremely compact and flat design
- High acceleration
- UL-certified



HIWIN LMS linear motors – “The solid all-rounder”

[Page 16](#)

- Proven endurance runner
- High feed forces
- High acceleration



HIWIN LMC linear motors – “The dynamic sprinter”

[Page 12](#)

- Ironless lightweight
- Extremely dynamic
- No cogging, thus highest synchronous operation



HIWIN LMFA linear motors – “The cooled heavy-duty drive”

[Page 39](#)

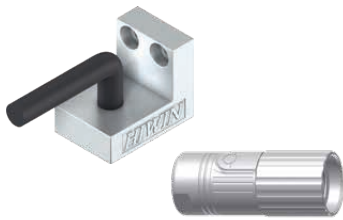
- Integrated cooling system
- Extremely high thrust up to 20,000 N
- High acceleration
- UL-certified



HIWIN LMFP linear motors – “The sealed heavy-duty drive”

[Page 58](#)

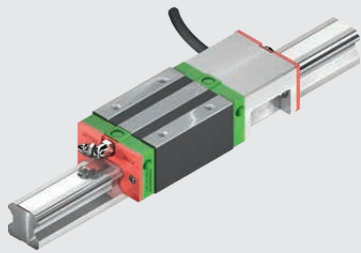
- Protection class IP65 thanks to encapsulated design
  - Integrated cooling system
  - Extremely high thrust up to over 20,000 N
  - High acceleration
-



#### Accessories

[Page 72](#)

- Hall sensors
- Motor cables
- Motor connectors



#### HIWIN MAGIC – magnetic distance measuring systems

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- Zero contact measuring with 1 V<sub>PP</sub> or digital output
- Digital resolution of up to 0.5 μm
- Encoder with metal housing and IP67 protection mode
- Signal output in real time

# Linear Motors & Distance Measuring Systems

HIWIN LMSA linear motors

## 2. HIWIN LMSA linear motors

### 2.1 Special characteristics of the LMSA linear motors

The HIWIN LMSA synchronous linear motors are the compact power packs of linear actuators. The linear motors in the LMSA series stand out for their extremely high power density and very flat design. Due to their low motor mass, the actuators can be operated in a highly dynamic manner. A high synchronous operation is achieved through the optimised configuration of the permanent magnets in the stator. The benefits of the LMSA linear motors make them the preferred choice in fields with limited installation space and high feed thrust requirements.



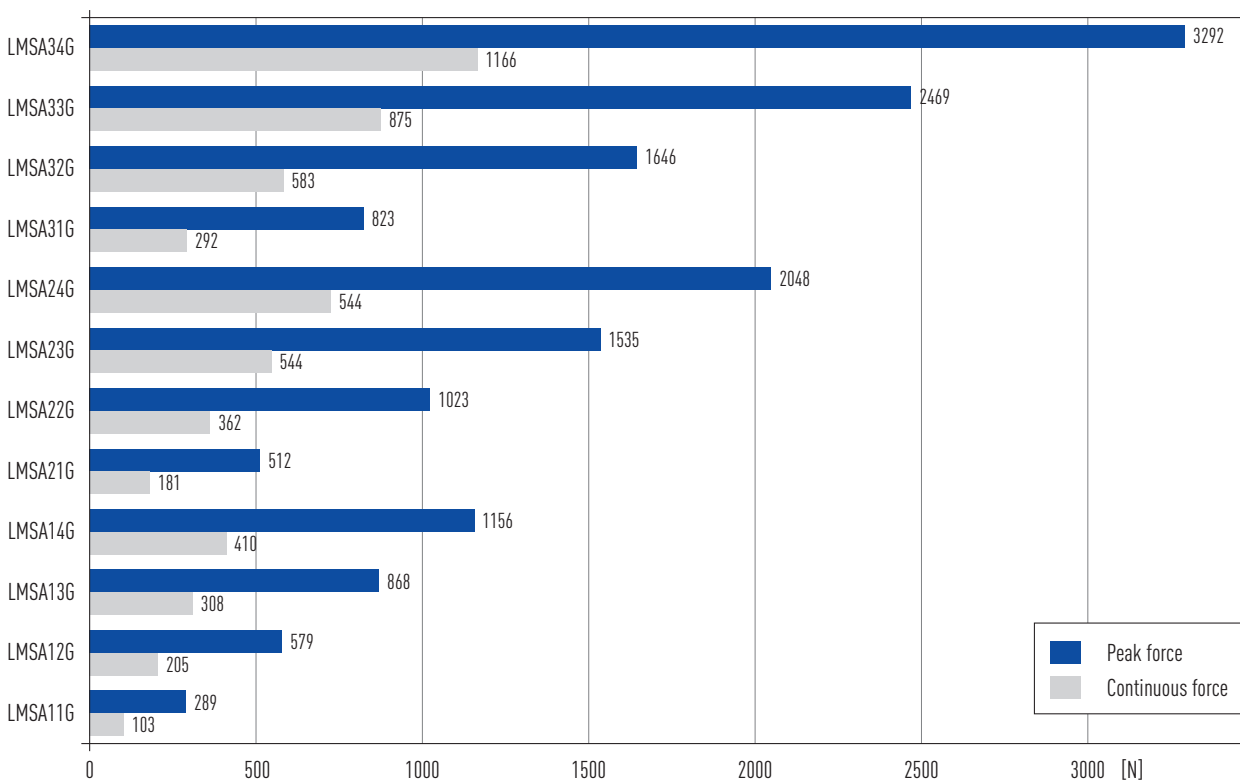
#### Key features of the LMSA linear motors:

- Highest power density
- Flat design
- High acceleration
- High synchronous run
- Full epoxy encapsulation of permanent magnets in the stator
- UL-certified
- Optional: version with Hall sensor

#### Typical fields of application of the LMSA linear motors:

- Automation technology
- Handling
- Packaging
- Semiconductors
- Measuring technology

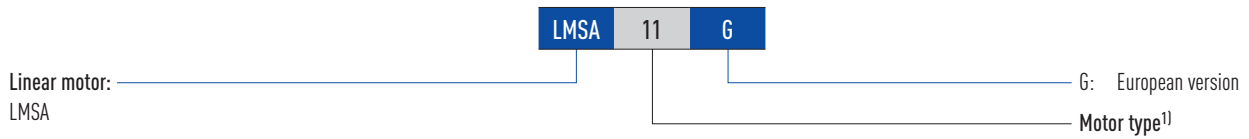
### 2.2 Force chart for LMSA linear motors





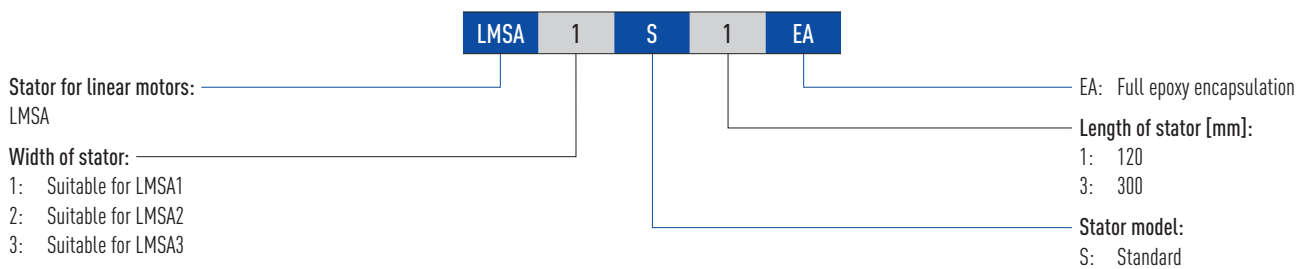
## 2.3 Order code LMSA linear motors

### 2.3.1 Order code of primary part (forcer)



<sup>1)</sup> See [Table 2.1](#) (LMSA1)  
[Table 2.3](#) (LMSA2)  
[Table 2.5](#) (LMSA3)

### 2.3.2 Order code of magnet track (stator)



# Linear Motors & Distance Measuring Systems

HIWIN LMSA linear motors

## 2.4 LMSA linear motor specifications

### 2.4.1 LMSA1 linear motor specifications

Force-velocity curves (DC bus voltage: 600 VDC)

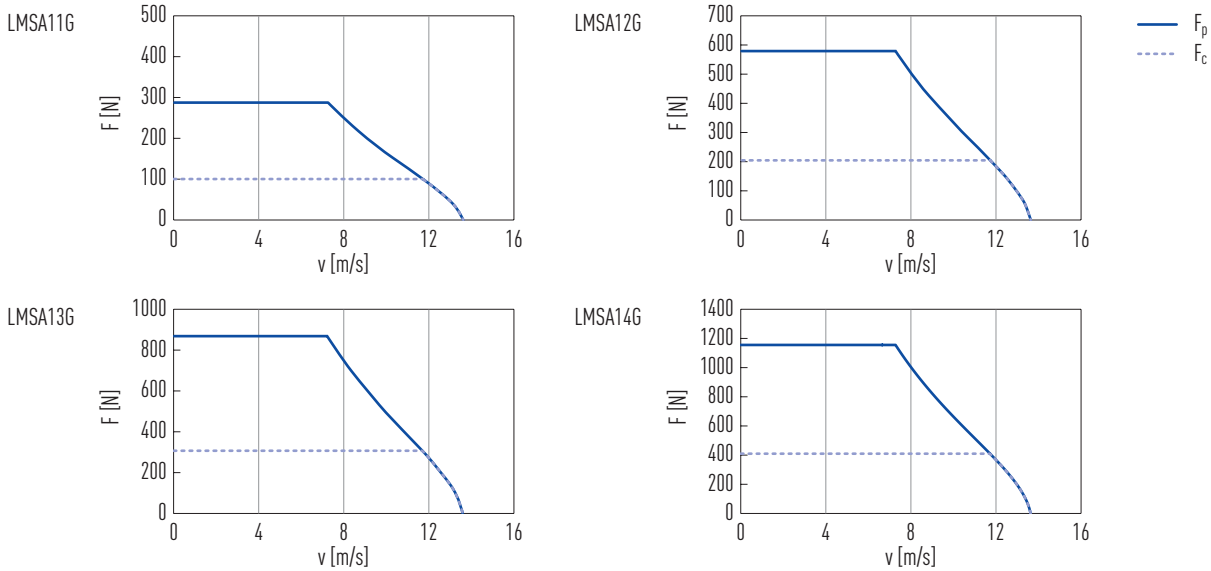
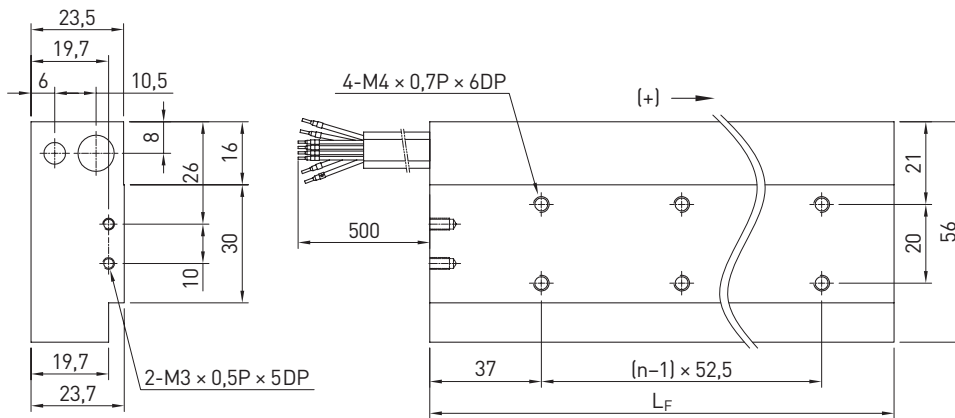


Table 2.1 Technical data for LMSA1

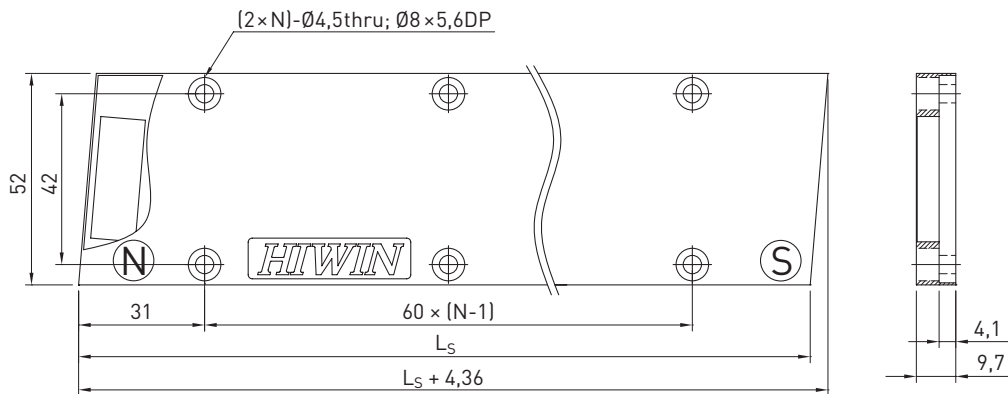
	Symbol	Unit	LMSA11G	LMSA12G	LMSA13G	LMSA14G
<b>Forces and electrical parameters</b>						
Continuous force at $T_{max}$	$F_c$	N	103	205	308	410
Continuous current at $T_{max}$	$I_c$	$A_{eff}$	2.1	4.2	6.3	8.4
Peak force (for 1 s)	$F_p$	N	289	579	868	1,156
Peak current (for 1 s)	$I_p$	$A_{eff}$	6.3	12.7	19.0	25.3
Ultimate force (for 0.5 s)	$F_u$	N	379	759	1,138	1,517
Ultimate current (for 0.5 s)	$I_u$	$A_{eff}$	10.6	21.1	31.7	42.2
Force constant	$K_f$	$N/A_{eff}$	48.6	48.6	48.6	48.6
Attraction force	$F_a$	N	481	963	1,444	1,926
Electrical time constant	$K_e$	ms	4.4	4.5	4.4	4.4
Resistance <sup>1)</sup>	$R_{25}$	$\Omega$	8.4	4.1	2.8	2.1
Inductance <sup>1)</sup>	$L$	mH	37.1	18.5	12.4	9.3
Back EMF constant	$K_u$	$V_{eff}/(m/s)$	28.1	28.1	28.1	28.1
Motor constant	$K_m$	$N/\sqrt{W}$	13.7	19.6	23.7	27.4
Thermal resistance	$R_{th}$	$^{\circ}C/W$	1.23	0.63	0.41	0.31
Thermal time constant	$T_{th}$	s	610	890	2.290	
Thermal switch			1 × PT1000 + 1 × (3 PTC SNM 120 in series)			
Max. DC bus voltage		V	750			
<b>Mechanical parameters</b>						
Max. bending radius of motor cable	$R_{bend}$	mm	69			
Pole pair pitch	$2\tau$	mm	30			
Max. winding temperature	$T_{max}$	$^{\circ}C$	120			
Mounting holes (forcer)	$n$		2	4	6	8
Weight of forcer	$M_f$	kg	0.7	1.4	2.1	2.8
Length of forcer	$L_f$	mm	118	223	328	433
Unit mass of stator	$M_s$	kg/m	2.7			
Stator length/Dimension N	$L_s$	mm	120 mm/N = 2; 300 mm/N = 5			
Total height (forcer + stator)	$H$	mm	34			

All specifications are in  $\pm 10\%$  of tolerance at 25  $^{\circ}C$  ambient temperature <sup>1)</sup> Line to line

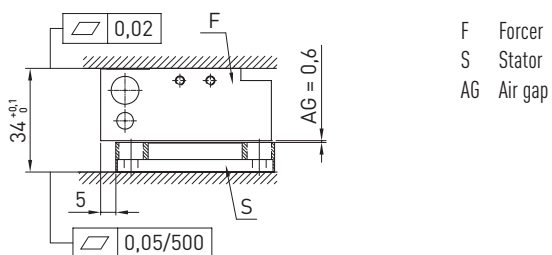
**Dimensions of forcer**



**Dimensions of stator**



**Mounting tolerances**



Motor cable	Signal	Diameter [mm]	
1	U	9.2	
2	V		
3	W		
Green/Yellow	GND	5.5	
Yellow	T1+		PTC SNM 120
Green	T1-		
Brown	T2+		PT1000
White	T2-		

# Linear Motors & Distance Measuring Systems

HIWIN LMSA linear motors

## 2.4.2 LMSA2 linear motor specifications

Force-velocity curves (DC bus voltage: 600 VDC)

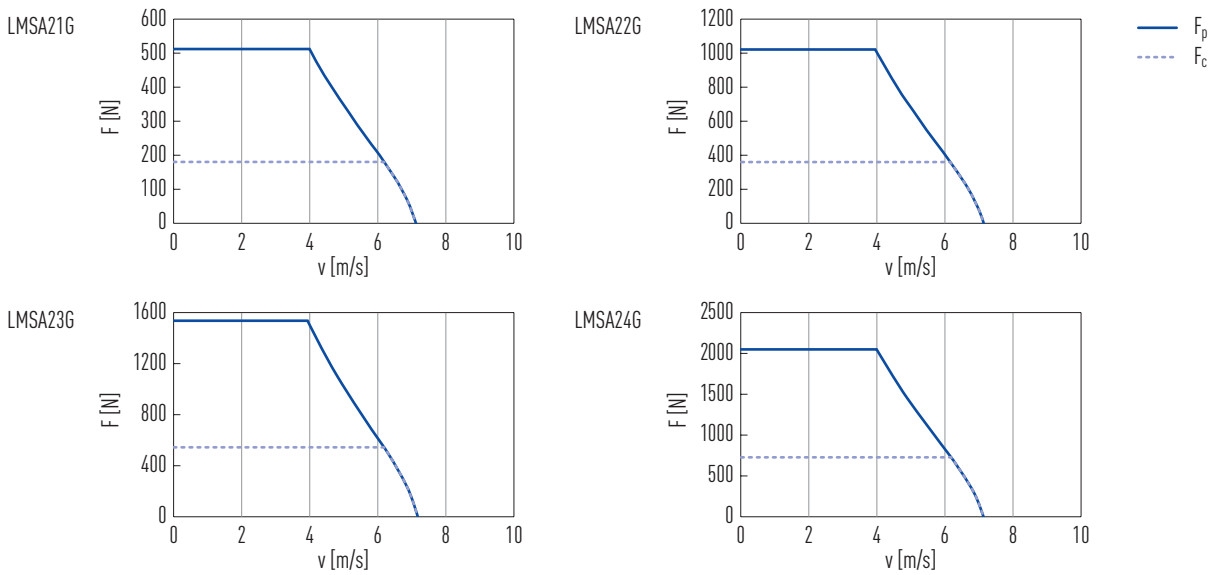


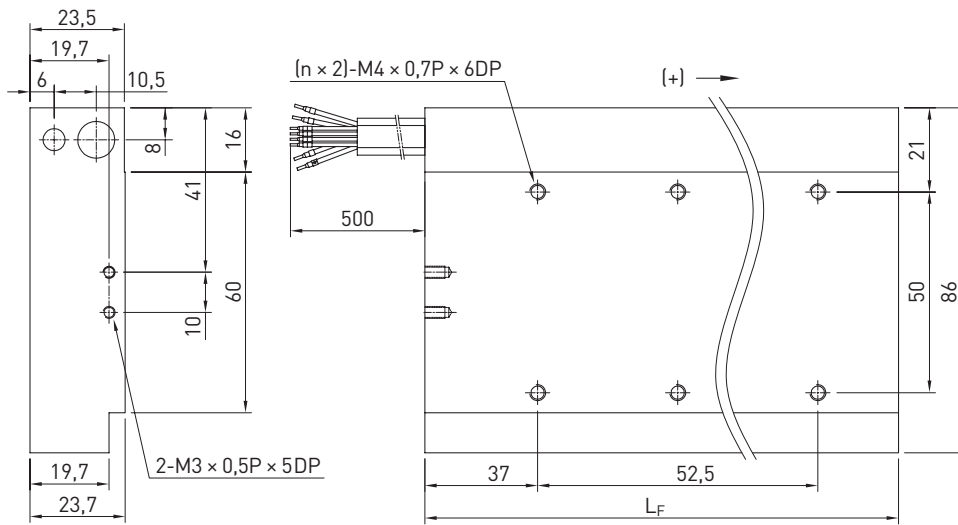
Table 2.3 Technical data for LMSA2

	Symbol	Unit	LMSA21G	LMSA22G	LMSA23G	LMSA24G
<b>Forces and electrical parameters</b>						
Continuous force at $T_{max}$	$F_c$	N	181	362	544	725
Continuous current at $T_{max}$	$I_c$	$A_{eff}$	2.0	3.9	5.9	7.8
Peak force (for 1 s)	$F_p$	N	512	1,023	1,535	2,048
Peak current (for 1 s)	$I_p$	$A_{eff}$	5.9	11.8	17.6	23.5
Ultimate force (for 0.5 s)	$F_u$	N	670	1,341	2,011	2,682
Ultimate current (for 0.5 s)	$I_u$	$A_{eff}$	9.8	19.6	29.4	39.2
Force constant	$K_f$	$N/A_{eff}$	92.5	92.5	92.5	92.5
Attraction force	$F_a$	N	963	1,926	2,888	3,851
Electrical time constant	$K_e$	ms	4.6	4.9	4.9	4.6
Resistance <sup>1)</sup>	$R_{25}$	$\Omega$	13.8	6.8	4.6	3.5
Inductance <sup>1)</sup>	L	mH	64.0	33.0	22.4	16.0
Back EMF constant	$K_u$	$V_{eff}/(m/s)$	53.4	53.4	53.4	53.4
Motor constant	$K_m$	$N/\sqrt{W}$	20.3	28.9	35.2	40.6
Thermal resistance	$R_{th}$	$^{\circ}C/W$	0.87	0.44	0.29	0.22
Thermal time constant	$T_{th}$	s	975	2,540	2,670	3,270
Thermal switch			1 × PT1000 + 1 × [3 PTC SNM 120 in series]			
Max. DC bus voltage		V	750			
<b>Mechanical parameters</b>						
Max. bending radius of motor cable	$R_{bend}$	mm	69			
Pole pair pitch	$2\tau$	mm	30			
Max. winding temperature	$T_{max}$	$^{\circ}C$	120			
Mounting holes (forcer)	n		2	4	6	8
Weight of forcer	$M_f$	kg	1.1	2.2	3.3	4.4
Length of forcer	$L_f$	mm	118	223	328	433
Unit mass of stator	$M_s$	kg/m	4.8			
Stator length/mounting holes	$L_s$	mm	120 mm/N = 2; 300 mm/N = 5			
Total height (forcer + stator)	H	mm	34			

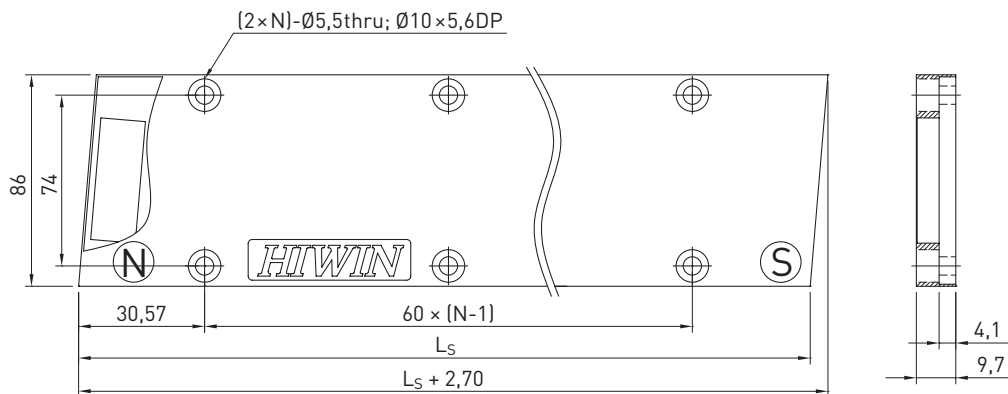
All specifications are in  $\pm 10\%$  of tolerance at 25  $^{\circ}C$  ambient temperature

<sup>1)</sup> Line to line

**Dimensions of forcer**



**Dimensions of stator**



**Mounting tolerances**

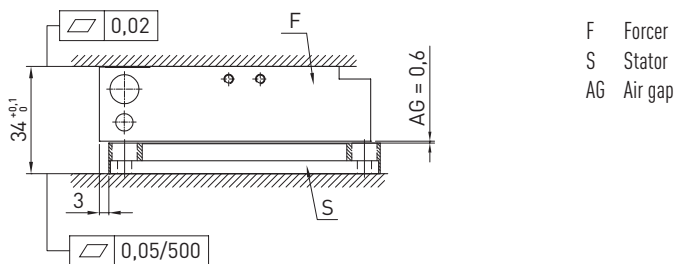


Table 2.4 LMSA2 motor cable assignment

Motor cable	Signal		Diameter [mm]
1	U		9.2
2	V		
3	W		
Green/Yellow	GND		
Yellow	T1+	PTC SNM 120	5.5
Green	T1-		
Brown	T2+	PT1000	
White	T2-		

# Linear Motors & Distance Measuring Systems

HIWIN LMSA linear motors

## 2.4.3 LMSA3 linear motor specifications

Force-velocity curves (DC bus voltage: 600 VDC)

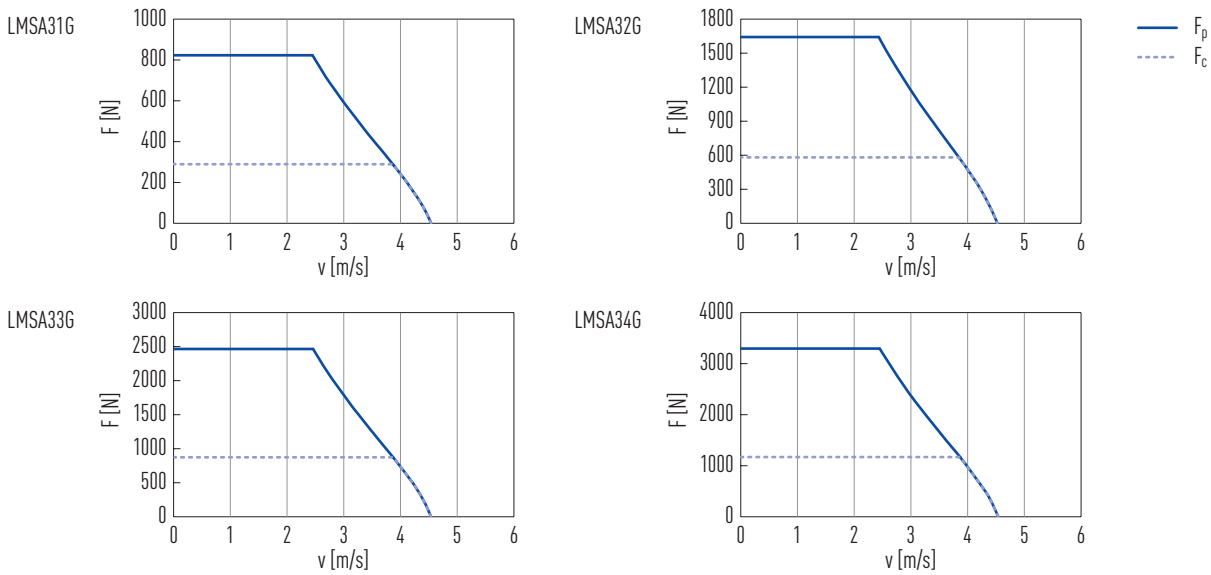


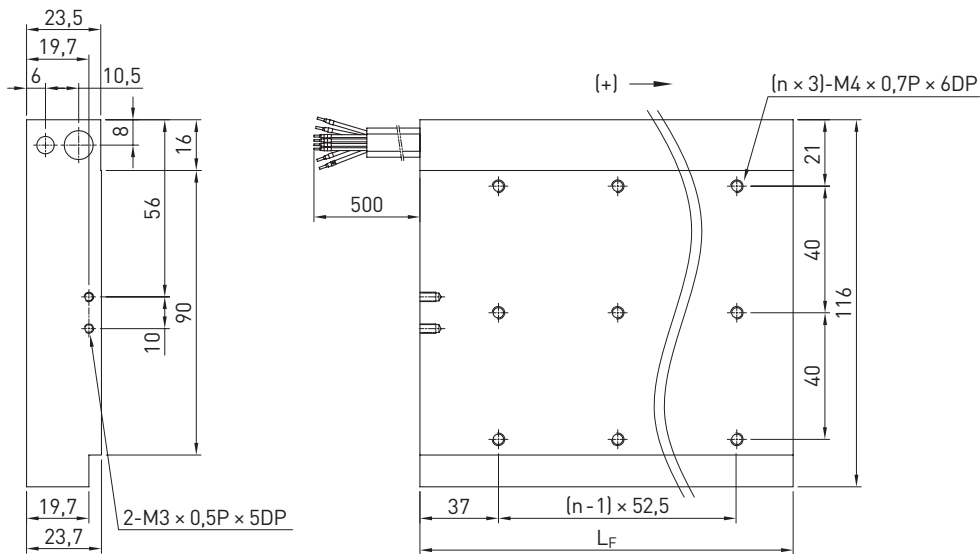
Table 2.5 Technical data for LMSA3

	Symbol	Unit	LMSA31G	LMSA32G	LMSA33G	LMSA34G
<b>Forces and electrical parameters</b>						
Continuous force at $T_{max}$	$F_c$	N	292	583	875	1,166
Continuous current at $T_{max}$	$I_c$	$A_{eff}$	2.0	4.0	6.0	8.0
Peak force (for 1 s)	$F_p$	N	823	1,646	2,469	3,292
Peak current (for 1 s)	$I_p$	$A_{eff}$	6.0	12.0	18.0	24.0
Ultimate force (for 0.5 s)	$F_u$	N	1,079	2,157	3,236	4,314
Ultimate current (for 0.5 s)	$I_u$	$A_{eff}$	10.0	20.0	30.0	40.0
Force constant	$K_f$	$N/A_{eff}$	145.8	145.8	145.8	145.8
Attraction force	$F_a$	N	1,444	2,888	4,333	5,777
Electrical time constant	$K_e$	ms	4.9	4.9	4.9	4.9
Resistance <sup>1)</sup>	$R_{25}$	$\Omega$	19.2	9.6	6.4	4.8
Inductance <sup>1)</sup>	$L$	mH	94.1	47.1	31.3	23.5
Back EMF constant	$K_u$	$V_{eff}/(m/s)$	84.2	84.2	84.2	84.2
Motor constant	$K_m$	$N/\sqrt{W}$	27.2	38.4	47.0	54.3
Thermal resistance	$R_{th}$	$^{\circ}C/W$	0.60	0.30	0.20	0.15
Thermal time constant	$T_{th}$	s	1.440	3.060	3.480	4.800
Thermal switch			1 × PT1000 + 1 × [3 PTC SNM 120 in series]			
Max. DC bus voltage		V	750			
<b>Mechanical parameters</b>						
Max. bending radius of motor cable	$R_{bend}$	mm	69			
Pole pair pitch	$2\tau$	mm	30			
Max. winding temperature	$T_{max}$	$^{\circ}C$	120			
Mounting holes (forcer)	$n$		2	4	6	8
Weight of forcer	$M_f$	kg	1.9	3.8	5.7	7.6
Length of forcer	$L_f$	mm	118	223	328	433
Unit mass of stator	$M_s$	kg/m	8.5			
Stator length/mounting holes	$L_s$	mm	120 mm/N = 2; 300 mm/N = 5			
Total height (forcer + stator)	$H$	mm	36			

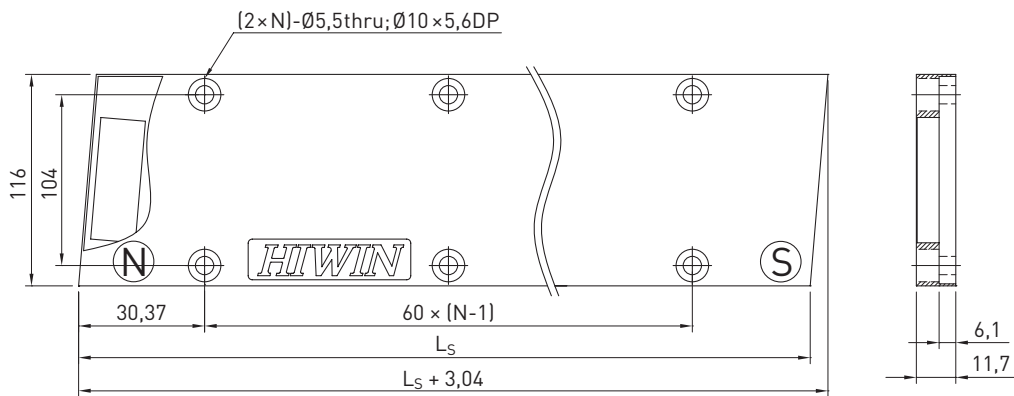
All specifications are in  $\pm 10\%$  of tolerance at 25  $^{\circ}C$  ambient temperature

<sup>1)</sup> Line to line

**Dimensions of forcer**



**Dimensions of stator**



**Mounting tolerances**

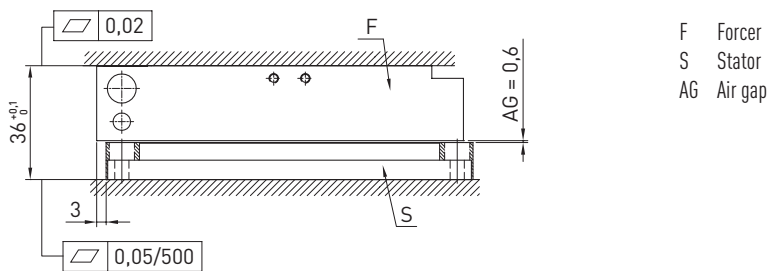


Table 2.6 LMSA3 motor cable assignment

Motor cable	Signal	Diameter [mm]	
1	U	9.2	
2	V		
3	W		
Green/Yellow	GND	5.5	
Yellow	T1+		PTC SNM 120
Green	T1-		
Brown	T2+		PT1000
White	T2-		

# Linear Motors & Distance Measuring Systems

HIWIN LMS linear motors

## 3. HIWIN LMS linear motors

### 3.1 Special characteristics of the LMS linear motors

The HIWIN LMS synchronous linear motors are the solid all-rounders of linear motors. The proven linear motors in the LMS series stand out for their robust design as well as high thrust and acceleration. The permanent magnets of the secondary parts (stators) are protected by a sheet metal cover. The benefits of the LMS linear motors make them the preferred choice in the field of dynamic positioning axes in automation systems especially with long travel distances.



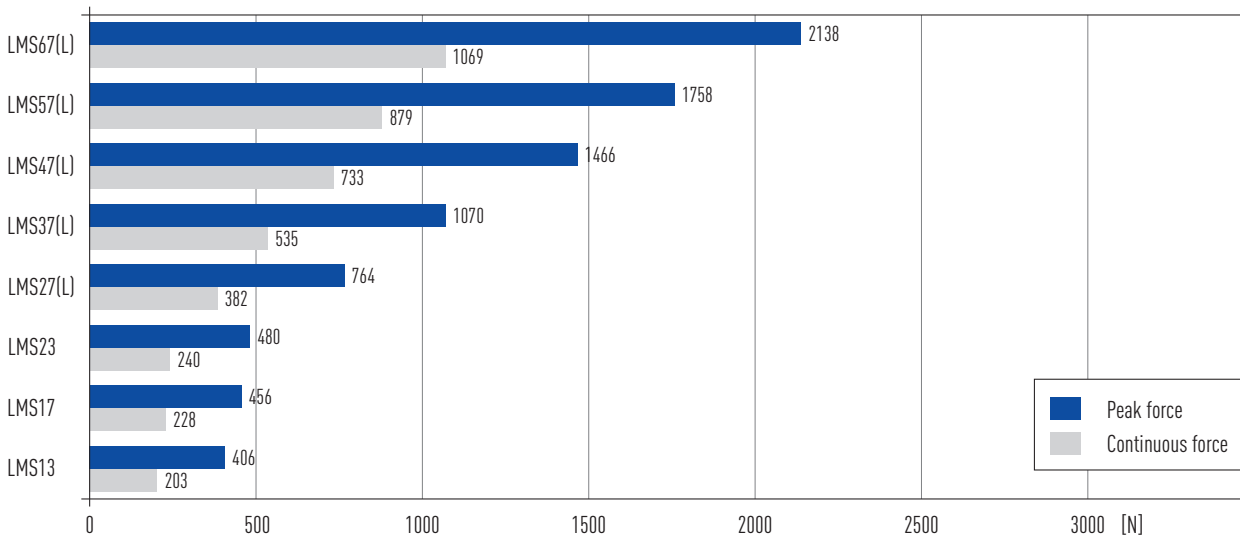
#### Key features of the LMS linear motors:

- High thrust
- High acceleration
- Stators with sheet metal cover

#### Typical fields of application of the LMS linear motors:

- Automation technology
- Handling
- Packaging

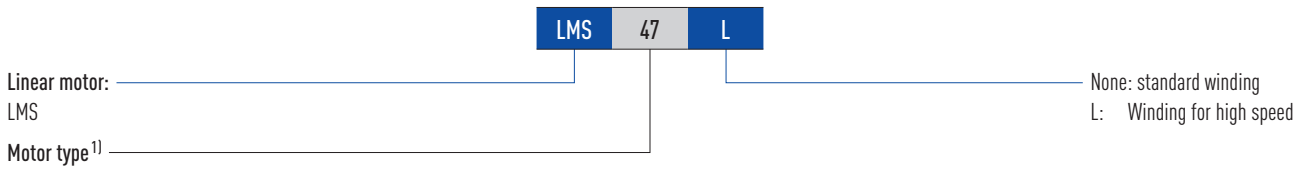
### 3.2 Force chart for LMS linear motors





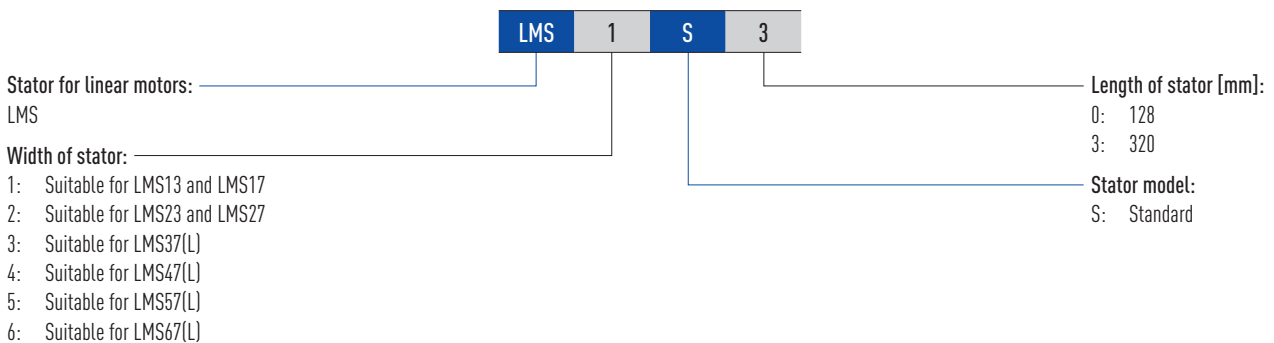
### 3.3 Order code LMS linear motors

#### 3.3.1 Order code of primary part (forcer)



<sup>11</sup> See [Table 3.1](#) (LMS1)  
[Table 3.3](#) (LMS2)  
[Table 3.5](#) (LMS3, LMS4)  
[Table 3.7](#) (LMS5, LMS6)

#### 3.3.2 Order code of magnet track (stator)



# Linear Motors & Distance Measuring Systems

HIWIN LMS linear motors

## 3.4 LMS linear motor specifications

### 3.4.1 LMS1 linear motor specifications

Force-velocity curves (DC bus voltage: 600 VDC)

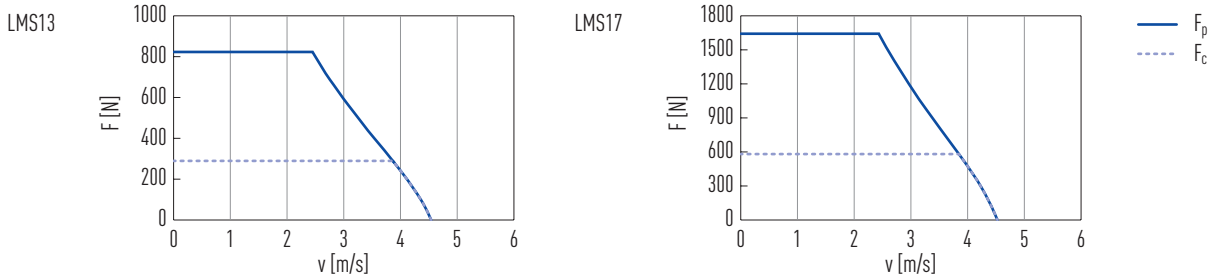


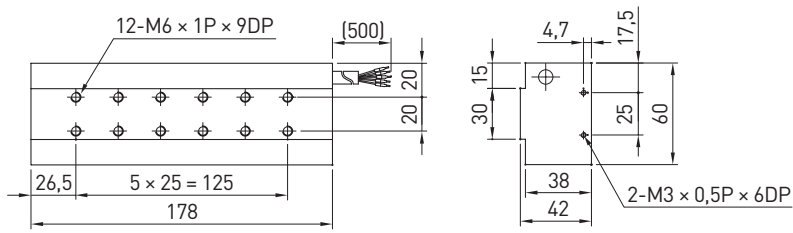
Table 3.1 Technical data for LMS1

	Symbol	Unit	LMS13	LMS17
<b>Forces and electrical parameters</b>				
Continuous force at $T_{max}$	$F_c$	N	203	228
Continuous current at $T_{max}$	$I_c$	$A_{eff}$	4.6	3.9
Peak force (for 1 s)	$F_p$	N	406	456
Peak current (for 1 s)	$I_p$	$A_{eff}$	13.8	11.8
Force constant	$K_f$	$N/A_{eff}$	44	58
Attraction force	$F_a$	N	805	1,221
Electrical time constant	$K_e$	ms	10.4	10.6
Resistance <sup>1)</sup>	$R_{25}$	$\Omega$	3.1	4.8
Inductance <sup>1)</sup>	L	mH	32.2	50.8
Back EMF constant	$K_v$	$V_{eff}/(m/s)$	26	31
Motor constant	$K_m$	$N/\sqrt{W}$	20.4	21.6
Thermal resistance	$R_{th}$	$^{\circ}C/W$	0.7	0.6
Thermal time constant	$T_{th}$	s	4,350	4,950
Thermal switch			3 PTC SNM 120 in series	
Max. DC bus voltage		V	600	
<b>Mechanical parameters</b>				
Max. bending radius of motor cable	$R_{bend}$	mm	69	
Pole pair pitch	$2\tau$	mm	32	
Max. winding temperature	$T_{max}$	$^{\circ}C$	120	
Weight of forcer	$M_f$	kg	1.8	2.7
Unit mass of stator	$M_s$	kg/m	4.2	
Stator length/mounting holes	$L_s$	mm	128 mm/N = 2; 320 mm/N = 5	
Total height (forcer + stator)	H	mm	55.2	57.4

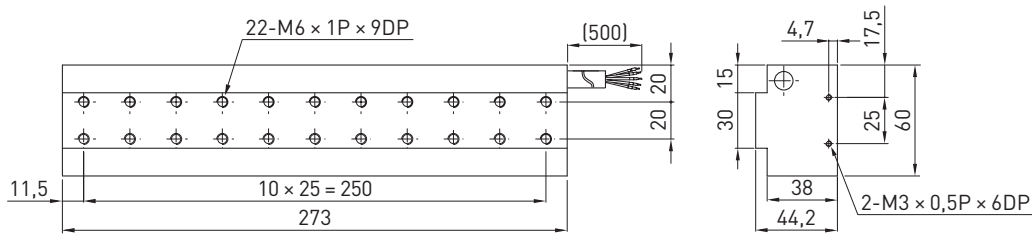
All specifications are in  $\pm 10\%$  of tolerance at 25  $^{\circ}C$  ambient temperature

<sup>1)</sup> Line to line

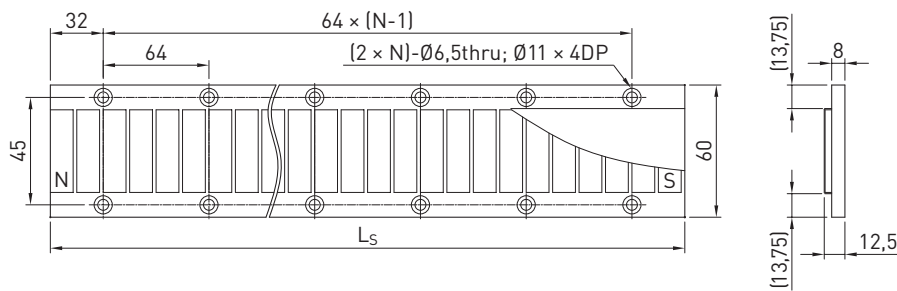
**Dimensions of LMS13 forcer**



**Dimensions of LMS17 forcer**



**Dimensions of stator**



**Mounting tolerances**

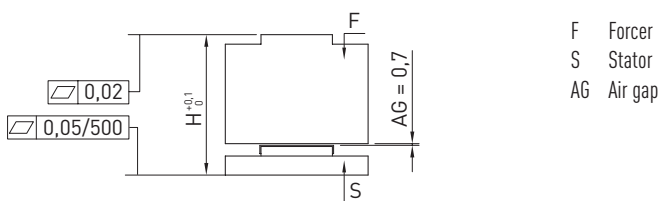


Table 3.2 LMS1 motor cable assignment

Motor cable	Signal	Diameter [mm]
1	U	9.0
2	V	
3	W	
4	—	
5	T+	
6	T-	
Green/Yellow	GND	

# Linear Motors & Distance Measuring Systems

HIWIN LMS linear motors

## 3.4.2 LMS2 linear motor specifications

Force-velocity curves (DC bus voltage: 600 VDC)

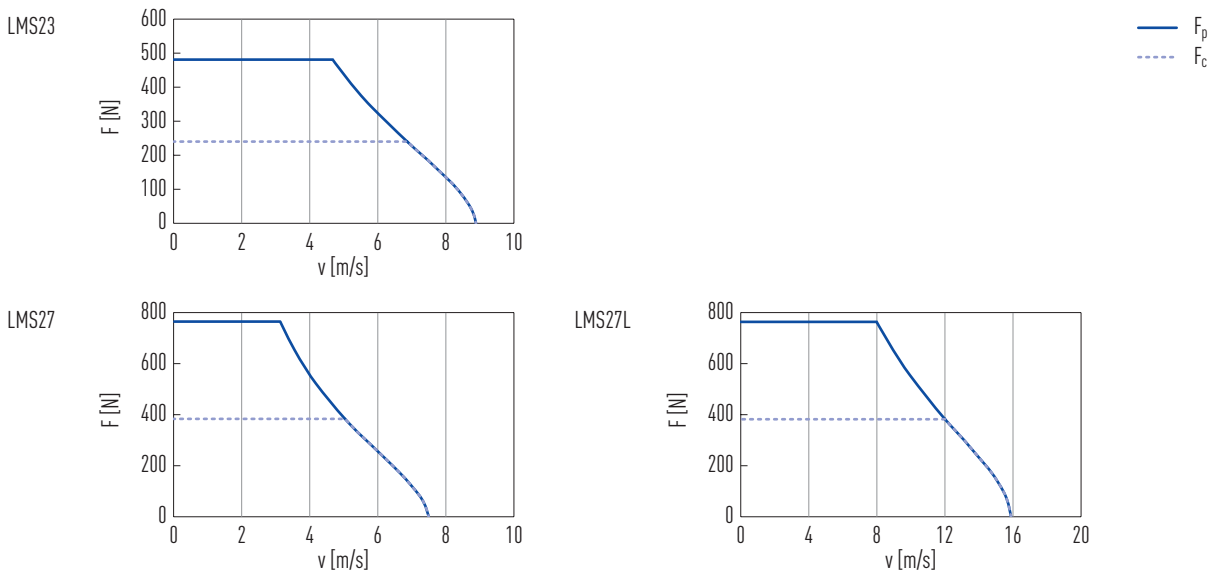


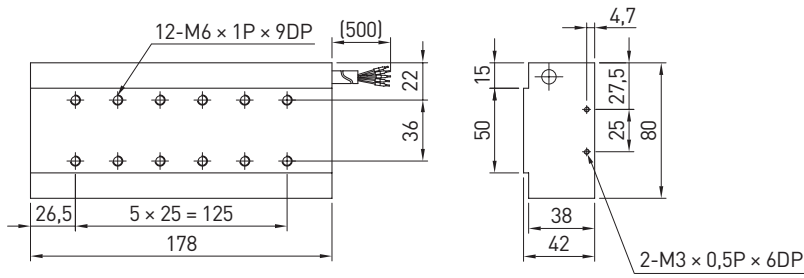
Table 3.3 Technical data for LMS2

	Symbol	Unit	LMS23	LMS27	LMS27L
<b>Forces and electrical parameters</b>					
Continuous force at $T_{max}$	$F_c$	N	240	382	
Continuous current at $T_{max}$	$I_c$	$A_{eff}$	3.9	3.9	7.9
Peak force (for 1 s)	$F_p$	N	480	764	
Peak current (for 1 s)	$I_p$	$A_{eff}$	11.8	11.8	23.7
Force constant	$K_f$	$N/A_{eff}$	61	97	46
Attraction force	$F_a$	N	1,350	2,036	
Electrical time constant	$K_e$	ms	10.5	11.3	8.9
Resistance <sup>1)</sup>	$R_{25}$	$\Omega$	4.6	6.8	1.6
Inductance <sup>1)</sup>	$L$	mH	48.4	76.8	14.0
Back EMF constant	$K_u$	$V_{eff}/(m/s)$	43	51	24
Motor constant	$K_m$	$N/\sqrt{W}$	23.2	30.4	31.4
Thermal resistance	$R_{th}$	$^{\circ}C/W$	0.7	0.5	0.5
Thermal time constant	$T_{th}$	s	4,730	6,820	
Thermal switch			3 PTC SNM 120 in series		
Max. DC bus voltage		V	600		
<b>Mechanical parameters</b>					
Max. bending radius of motor cable	$R_{bend}$	mm	69		
Pole pair pitch	$2\tau$	mm	32		
Max. winding temperature	$T_{max}$	$^{\circ}C$	120		
Weight offorcer	$M_f$	kg	2.7	4.1	
Unit mass of stator	$M_s$	kg/m	6.2		
Stator length/mounting holes	$L_s$	mm	128 mm/N = 2; 320 mm/N = 5		
Total height (forcer + stator)	$H$	mm	55.2	57.4	

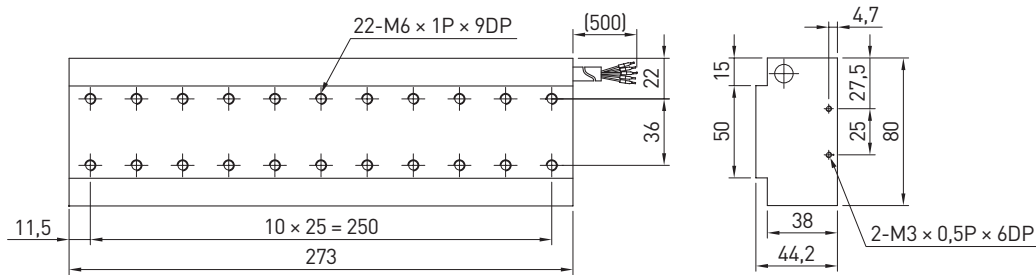
All specifications are in  $\pm 10\%$  of tolerance at 25  $^{\circ}C$  ambient temperature

<sup>1)</sup> Line to line

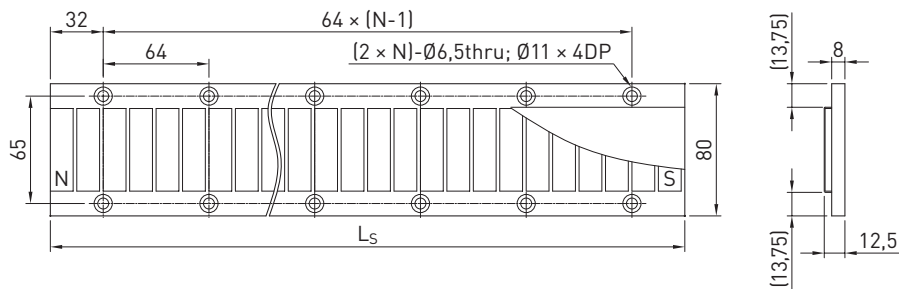
**Dimensions of LMS23 forcer**



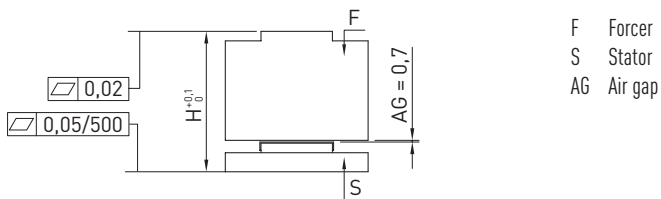
**Dimensions of LMS27(L) forcer**



**Dimensions of stator**



**Mounting tolerances**



Motor cable	Signal	Diameter [mm]
1	U	9.0
2	V	
3	W	
4	—	
5	T+	
6	T-	
Green/Yellow	GND	

# Linear Motors & Distance Measuring Systems

HIWIN LMS linear motors

## 3.4.3 LMS3, LMS4 linear motor specifications

Force-velocity curves (DC bus voltage: 600 VDC)

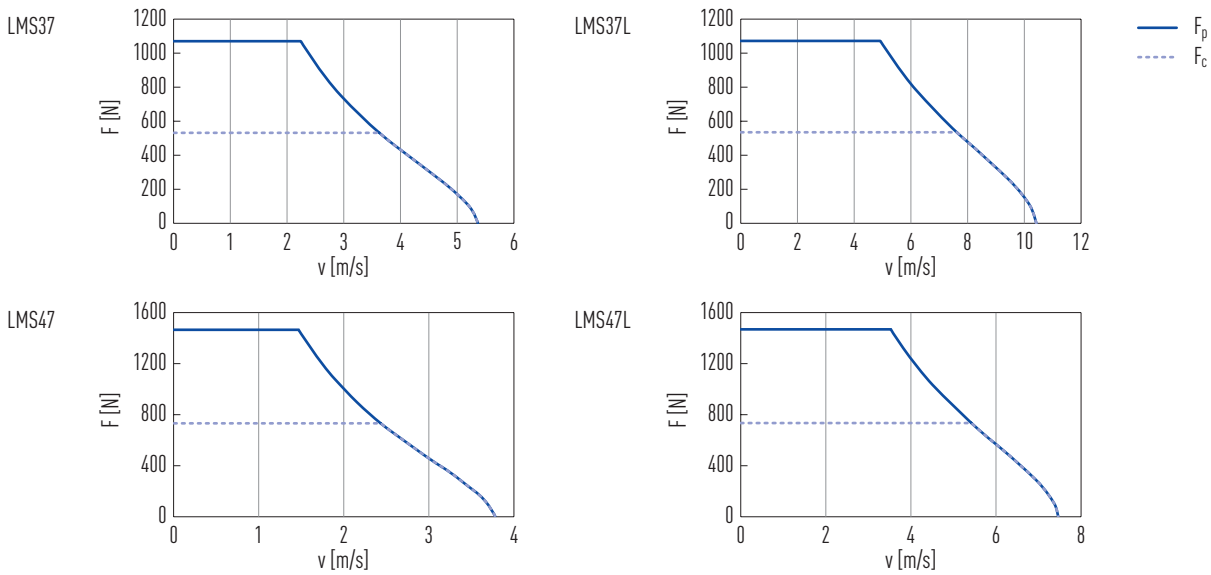


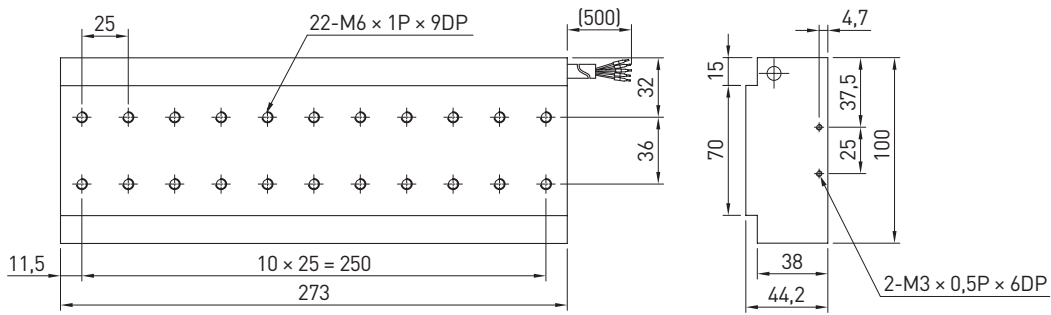
Table 3.5 Technical data for LMS3, LMS4

	Symbol	Unit	LMS37	LMS37L	LMS47	LMS47L	
<b>Forces and electrical parameters</b>							
Continuous force at $T_{max}$	$F_c$	N	535		733		
Continuous current at $T_{max}$	$I_c$	$A_{eff}$	3.9	7.9	3.9	7.9	
Peak force (for 1 s)	$F_p$	N	1,070		1,466		
Peak current (for 1 s)	$I_p$	$A_{eff}$	11.8	23.7	11.8	23.7	
Force constant	$K_f$	$N/A_{eff}$	136	68	186	93	
Attraction force	$F_a$	N	2,850			4,071	
Electrical time constant	$K_e$	ms	11.6	11.0	13.0	12.2	
Resistance <sup>1)</sup>	$R_{25}$	$\Omega$	8.9	2.1	11.9	2.7	
Inductance <sup>1)</sup>	$L$	mH	103.4	23.1	154.4	33.0	
Back EMF constant	$K_u$	$V_{eff}/(m/s)$	71	36	101	51	
Motor constant	$K_m$	$N/\sqrt{W}$	37.2	38.3	44.0	46.2	
Thermal resistance	$R_{th}$	$^{\circ}C/W$	0.3	0.4	0.3	0.3	
Thermal time constant	$T_{th}$	s	5,685			8,356	
Thermal switch			3 PTC SNM 120 in series				
Max. DC bus voltage		V	600				
<b>Mechanical parameters</b>							
Max. bending radius of motor cable	$R_{bend}$	mm	69				
Pole pair pitch	$2\tau$	mm	32				
Max. winding temperature	$T_{max}$	$^{\circ}C$	120				
Weight of forcer	$M_f$	kg	5.9			8.0	
Unit mass of stator	$M_s$	kg/m	8.2			11.5	
Width of stator	$W_s$	mm	100			130	
Stator mounting distance	$A_s$	mm	85			115	
Stator length/mounting holes	$L_s$	mm	128 mm/N = 2; 320 mm/N = 5				
Total height (forcer + stator)	$H$	mm	57.4				

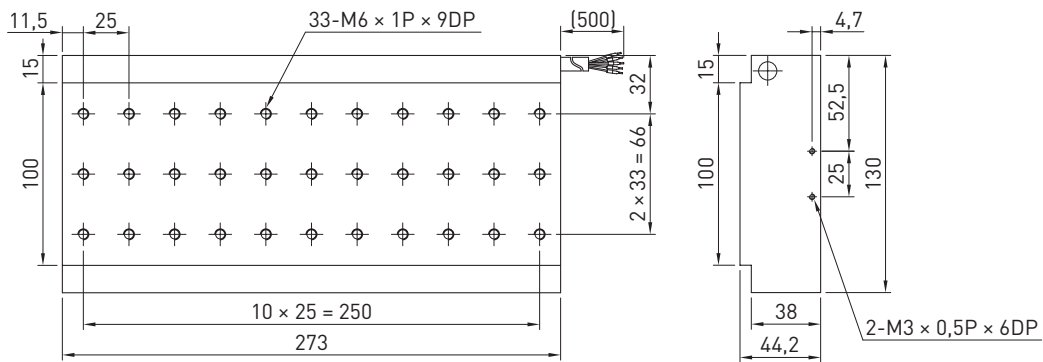
All specifications are in  $\pm 10\%$  of tolerance at 25  $^{\circ}C$  ambient temperature

<sup>1)</sup> Line to line

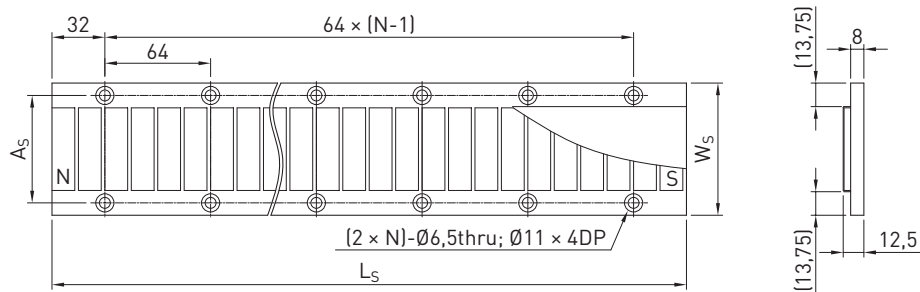
**Dimensions of LMS37(L) forcer**



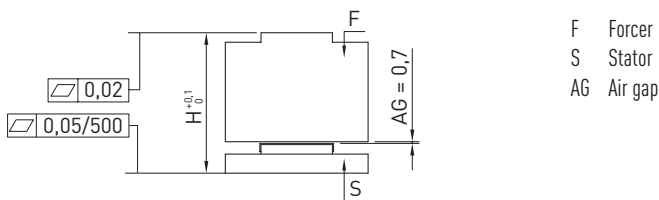
**Dimensions of LMS47(L) forcer**



**Dimensions of stator**



**Mounting tolerances**



Motor cable	Signal	Diameter [mm]
1	U	9.0
2	V	
3	W	
4	—	
5	T+	
6	T-	
Green/Yellow	GND	

# Linear Motors & Distance Measuring Systems

HIWIN LMS linear motors

## 3.4.4 LMS5, LMS6 linear motor specifications

Force-velocity curves (DC bus voltage: 600 VDC)

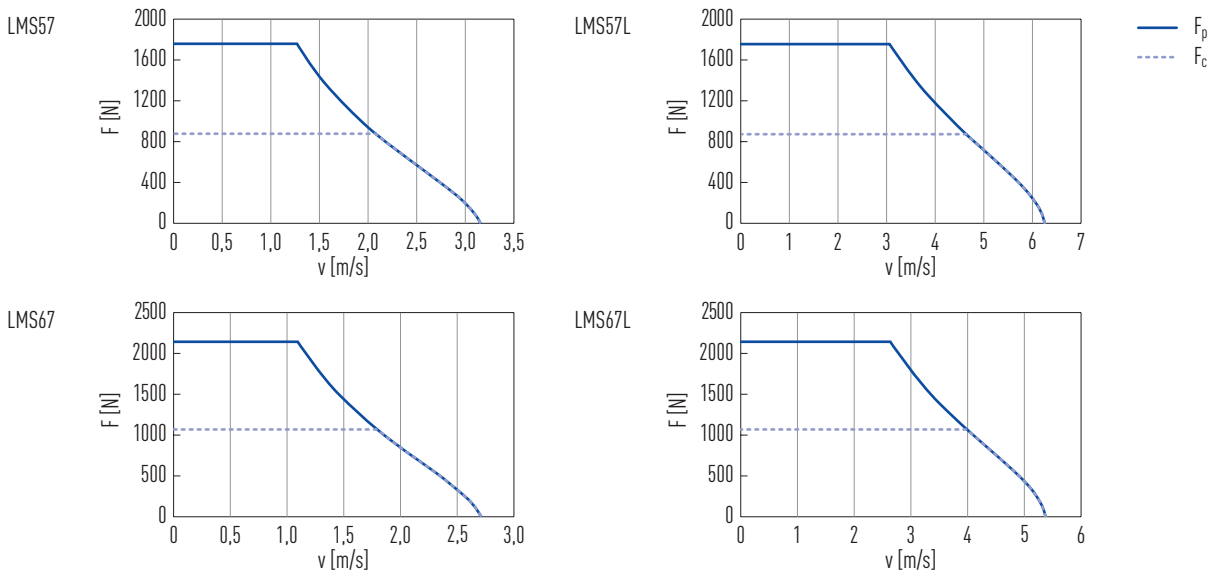


Table 3.7 Technical data for LMS5, LMS6

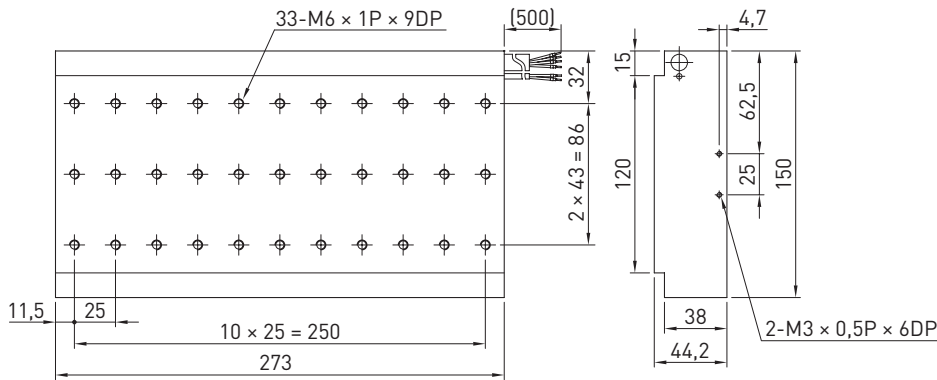
	Symbol	Unit	LMS57	LMS57L	LMS67	LMS67L
<b>Forces and electrical parameters</b>						
Continuous force at $T_{max}$	$F_c$	N	879		1,069	
Continuous current at $T_{max}$	$I_c$	$A_{eff}$	3.9	7.9	3.9	7.9
Peak force (for 1 s)	$F_p$	N	1,758		2,138	
Peak current (for 1 s)	$I_p$	$A_{eff}$	11.8	23.7	11.8	23.7
Force constant	$K_f$	$N/A_{eff}$	223	112	271	136
Attraction force	$F_a$	N	4,885		5,700	
Electrical time constant	$K_e$	ms	12.4	12.0	12.4	12.6
Resistance <sup>1)</sup>	$R_{25}$	$\Omega$	13.8	3.1	15.4	3.4
Inductance <sup>1)</sup>	$L$	mH	170.8	37.3	190.7	43.0
Back EMF constant	$K_u$	$V_{eff}/(m/s)$	121	61	141	71
Motor constant	$K_m$	$N/\sqrt{W}$	49.0	51.6	56.4	60.2
Thermal resistance	$R_{th}$	$^{\circ}C/W$	0.2	0.2	0.2	0.2
Thermal time constant	$T_{th}$	s	6,460		7,440	
Thermal switch			3 PTC SNM 120 in series			
Max. DC bus voltage		V	600			
<b>Mechanical parameters</b>						
Max. bending radius of motor cable	$R_{bend}$	mm	69			
Pole pair pitch	$2\tau$	mm	32			
Max. winding temperature	$T_{max}$	$^{\circ}C$	120			
Weight of forcer	$M_f$	kg	9.4		10.8	
Unit mass of stator	$M_s$	kg/m	13.7		15.9	
Width of stator	$W_s$	mm	150		170	
Stator mounting distance	$A_s$	mm	135		155	
Stator length/mounting holes	$L_s$	mm	128 mm/N = 2; 320 mm/N = 5			
Total height (forcer + stator)	$H$	mm	57.4			

All specifications are in  $\pm 10\%$  of tolerance at  $25^{\circ}C$  ambient temperature;

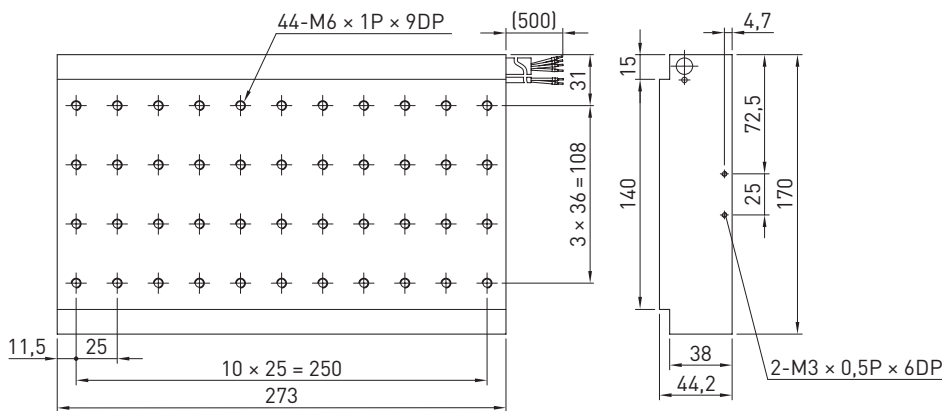
<sup>1)</sup> Line to line



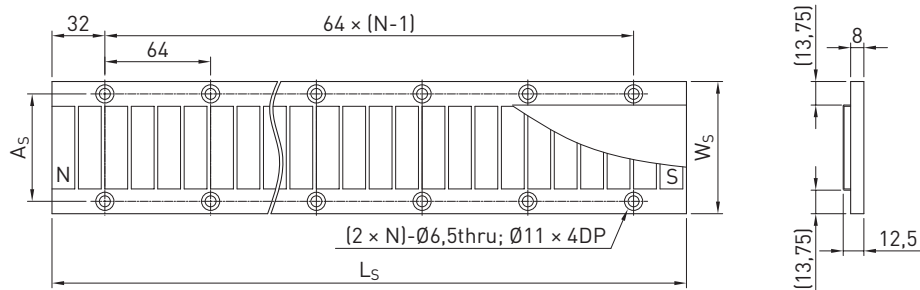
**Dimensions of LMS57(L) forcer**



**Dimensions of LMS67(L) forcer**



**Dimensions of stator**



**Mounting tolerances**

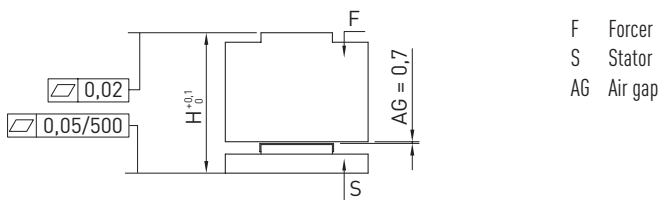


Table 3.8 LMS5, LMS6 motor cable assignment

Motor cable	Signal	Diameter [mm]
1	U	9.0
2	V	
3	W	
4	—	
5	T+	
6	T-	
Green/Yellow	GND	

# Linear Motors & Distance Measuring Systems

HIWIN LMC linear motors

## 4. HIWIN LMC linear motors

### 4.1 Special characteristics of the LMC linear motors

The HIWIN LMC synchronous linear motors are the dynamic sprinters of linear actuators. With the light, ironlessforcer and the U-shaped design of the stators with opposing magnets, no cogging torques occur between forcers and stators, and no magnetic forces are introduced into the guiding system. The linear motors in the LMC series thus achieve extremely high synchronism and high acceleration due to the minimal forcer mass. The LMC linear motors are optionally available as a vacuum system. The benefits of the LMC linear motors make them the preferred choice in fields where small masses with a maximum number of cycles need to be positioned very precisely. Due to their very high synchronism, the LMC linear motors are also suitable for application in testing and measuring machines.



#### Key features of the LMC linear motors:

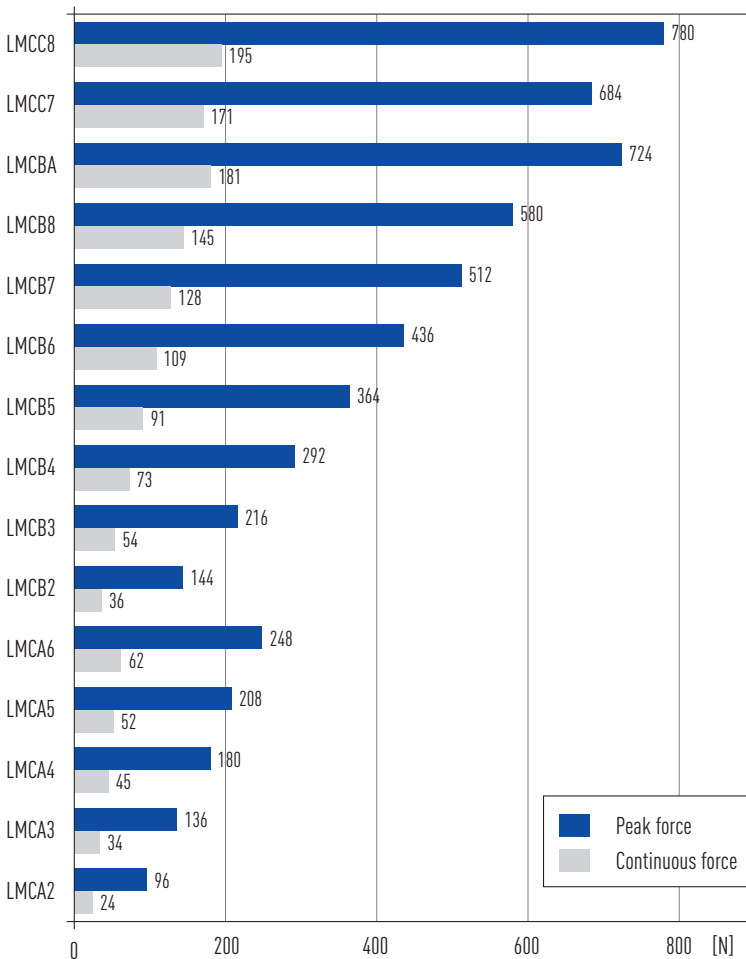
- Extremely dynamic
- No cogging, thus highest synchronous operation
- No magnetic pull in the guiding system
- Optional: design for vacuum applications
- Optional: version with Hall sensor

#### Typical fields of application of the LMC linear motors:

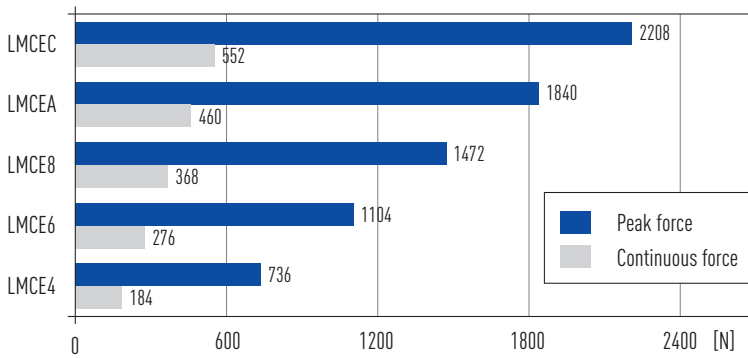
- Pick-and-place machines in semiconductor technology
- Air bearing axes
- Wafer structuring
- Pick-and-place machines
- High-precision measuring and testing machines
- Semiconductors

### 4.2 Force chart for LMC linear motors

Force chart for linear motors LMCA, LMCA, LMCC

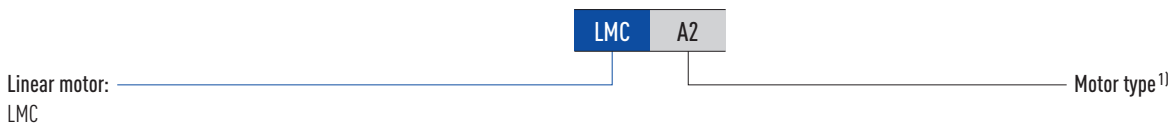


**Force chart for linear motors LMCE**



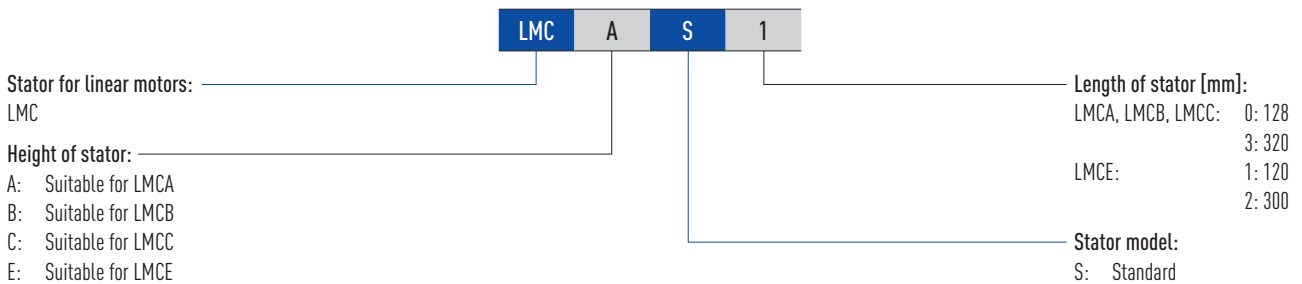
**4.3 Order code LMC linear motors**

**4.3.1 Order code of primary part (forcer)**



<sup>1)</sup> See [Table 4.1 \(LMCA\)](#)  
[Table 4.3 \(LMCB\)](#)  
[Table 4.5 \(LMCC\)](#)  
[Table 4.7 \(LMCE\)](#)

**4.3.2 Order code of magnet track (stator)**



# Linear Motors & Distance Measuring Systems

HIWIN LMC linear motors

## 4.4 LMC linear motor specifications

### 4.4.1 LMCA linear motor specifications

Force-velocity curves (DC bus voltage: 330 VDC)

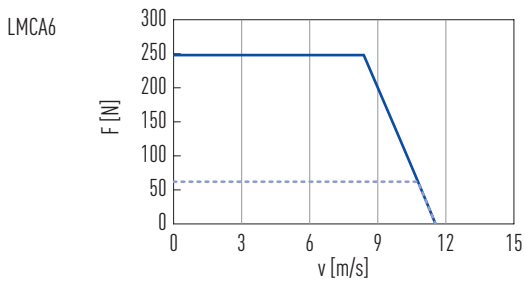
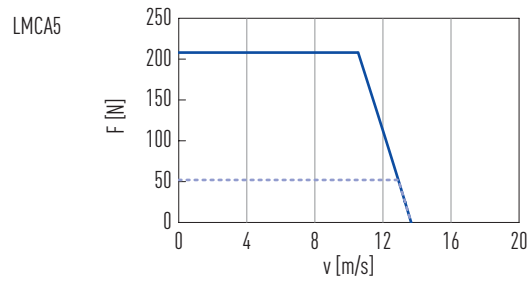
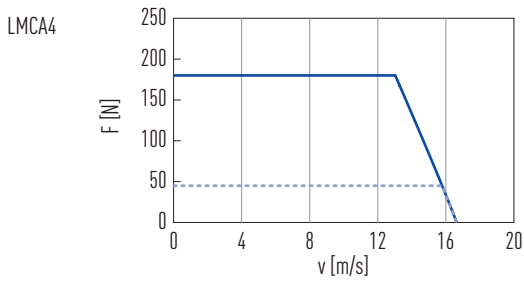
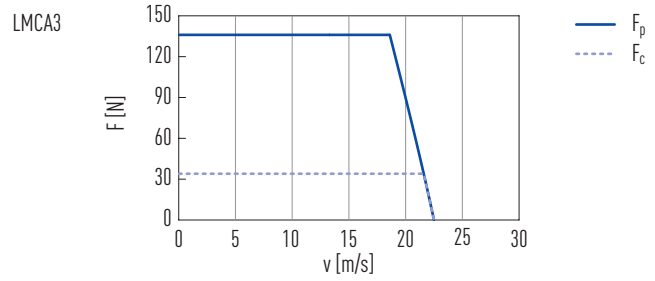
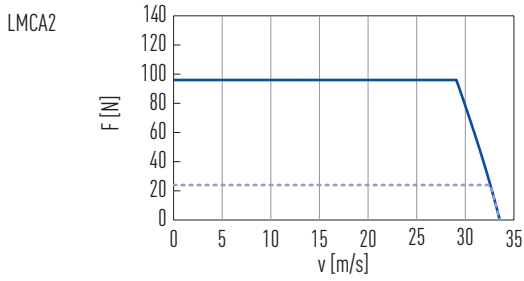


Table 4.1 **Technical data for LMCA**

	Symbol	Unit	LMCA2	LMCA3	LMCA4	LMCA5	LMCA6
<b>Forces and electrical parameters</b>							
Continuous force at $T_{max}$	$F_c$	N	24	34	45	52	62
Continuous current at $T_{max}$	$I_c$	$A_{eff}$	2.3	2.1	2.1	1.8	1.8
Peak force (for 1 s)	$F_p$	N	96	136	180	208	248
Peak current (for 1 s)	$I_p$	$A_{eff}$	9.2	8.4	8.4	7.2	7.2
Force constant	$K_f$	$N/A_{eff}$	10.6	15.8	21.2	28.2	33.8
Electrical time constant	$K_e$	ms	0.4	0.3	0.3	0.3	0.3
Resistance <sup>1)</sup>	$R_{25}$	$\Omega$	2.7	4.1	5.4	6.7	8.2
Inductance <sup>1)</sup>	L	mH	1.0	1.4	1.9	2.3	2.8
Back EMF constant	$K_u$	$V_{eff}/(m/s)$	5.9	8.8	11.9	14.5	17.4
Motor constant	$K_m$	$N/\sqrt{W}$	5.2	6.5	7.5	9.1	9.8
Thermal resistance	$R_{th}$	$^{\circ}C/W$	2.80	2.21	1.68	1.84	1.50
Thermal switch			3 PTC SNM 100 in series				
Max. DC bus voltage		V	330				
<b>Mechanical parameters</b>							
Max. bending radius of motor cable	$R_{bend}$	mm	37.5				
Pole pair pitch	$2\tau$	mm	32				
Max. winding temperature	$T_{max}$	$^{\circ}C$	100				
Mounting holes (forcer)	n		2	3	4	5	6
Weight of forcer	$M_f$	kg	0.15	0.23	0.31	0.38	0.45
Length of forcer	$L_f$	mm	66	98	130	162	194
Unit mass of stator	$M_s$	kg/m	7				
Stator length/mounting holes	$L_s$	mm	128 mm/N = 2; 320 mm/N = 5				

All specifications are in  $\pm 10\%$  of tolerance at  $25^{\circ}C$  ambient temperature

<sup>1)</sup> Line to line

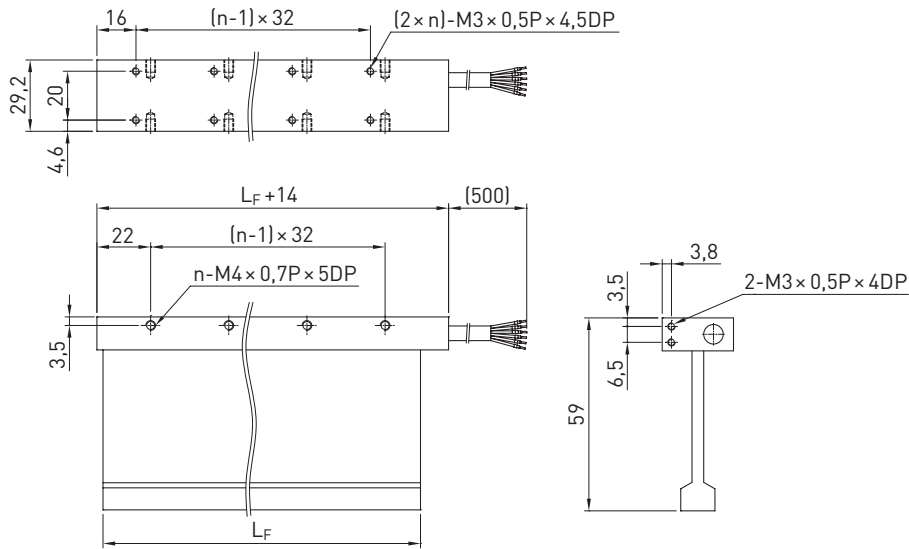
Table 4.2 **LMCA motor cable assignment**

Motor cable	Signal	Diameter [mm]
Brown	U	7.5
White	V	
Grey	W	
Black	GND	
Yellow	T+	
Green	T-	

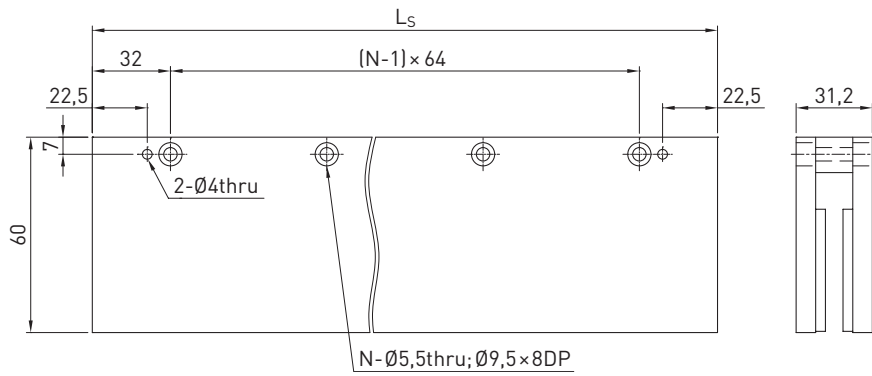
# Linear Motors & Distance Measuring Systems

HIWIN LMC linear motors

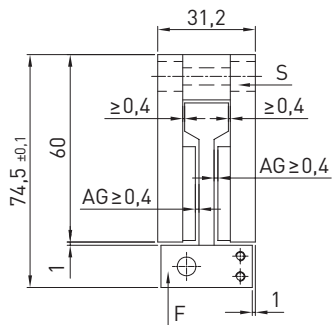
## Dimensions of forcer



## Dimensions of stator



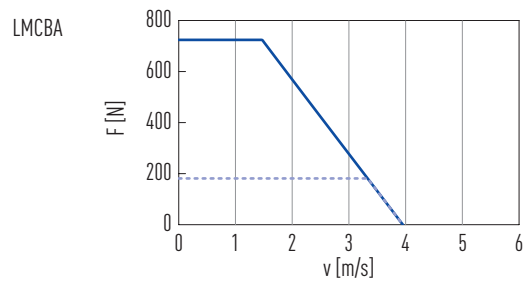
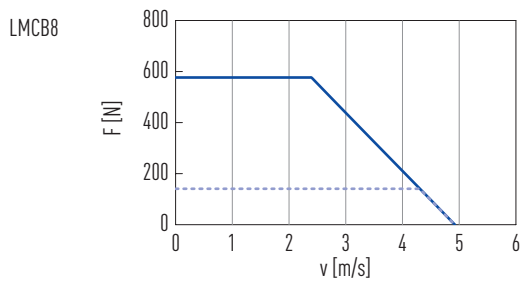
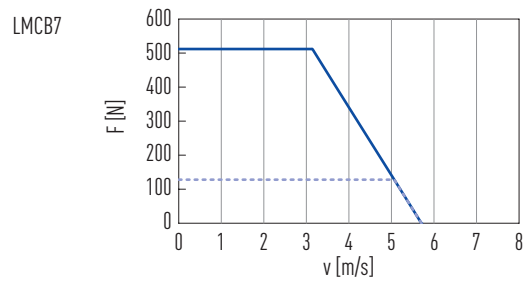
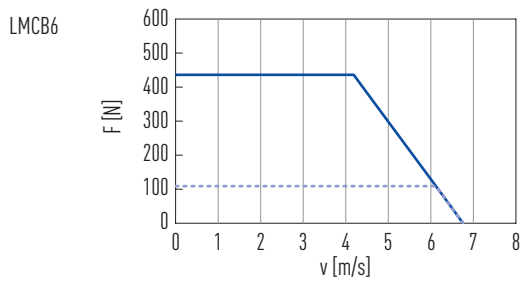
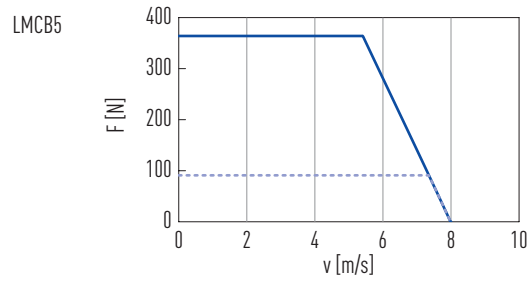
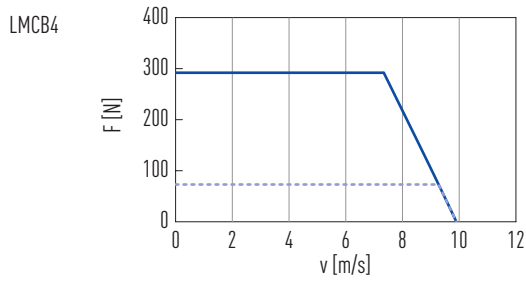
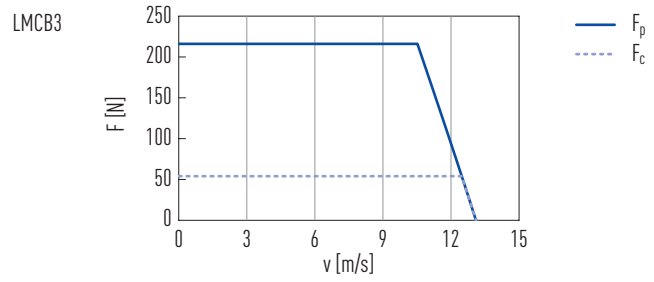
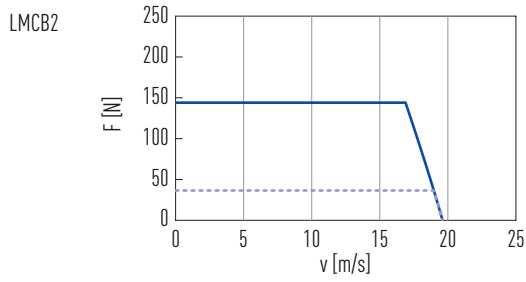
## Mounting tolerances



- F Forcer
- S Stator
- AG Air gap

#### 4.4.2 LMCB linear motor specifications

Force-velocity curves (DC bus voltage: 330 VDC)



# Linear Motors & Distance Measuring Systems

HIWIN LMC linear motors

Table 4.3 Technical data for LMCB

	Symbol	Unit	LMCB2	LMCB3	LMCB4	LMCB5	LMCB6	LMCB7	LMCB8	LMCBA
<b>Forces and electrical parameters</b>										
Continuous force at $T_{max}$	$F_c$	N	36	54	73	91	109	128	145	181
Continuous current at $T_{max}$	$I_c$	$A_{eff}$	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Peak force (for 1 s)	$F_p$	N	144	216	292	364	436	512	580	724
Peak current (for 1 s)	$I_p$	$A_{eff}$	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Force constant	$K_f$	$N/A_{eff}$	18.1	27.2	36.3	45.4	54.5	63.5	72.5	90.6
Electrical time constant	$K_e$	ms	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3
Resistance <sup>1)</sup>	$R_{25}$	$\Omega$	3.6	5.4	7.1	9.0	10.7	12.6	14.6	17.9
Inductance <sup>1)</sup>	L	mH	1.4	1.9	2.6	3.2	3.8	4.4	5.0	6.2
Back EMF constant	$K_u$	$V_{eff}/(m/s)$	10.1	15.2	20.0	24.8	29.3	34.7	40.0	50.0
Motor constant	$K_m$	$N/\sqrt{W}$	7.7	9.5	11.2	12.4	13.6	14.7	15.5	17.5
Thermal resistance	$R_{th}$	$^{\circ}C/W$	2.77	1.85	1.41	1.11	0.93	0.79	0.68	0.56
Thermal switch			3 PTC SNM 100 in series							
Max. DC bus voltage		V	330							
<b>Mechanical parameters</b>										
Max. bending radius of motor cable	$R_{bend}$	mm	37.5							
Pole pair pitch	$2\tau$	mm	32							
Max. winding temperature	$T_{max}$	$^{\circ}C$	100							
Mounting holes (forcer)	n		2	3	4	5	6	7	8	10
Weight of forcer	$M_f$	kg	0.20	0.29	0.38	0.48	0.58	0.68	0.72	0.88
Length of forcer	$L_f$	mm	66	98	130	162	194	226	258	322
Unit mass of stator	$M_s$	kg/m	12							
Stator length/mounting holes	$L_s$	mm	128 mm/N = 2; 320 mm/N = 5							

All specifications are in  $\pm 10\%$  of tolerance at  $25^{\circ}C$  ambient temperature

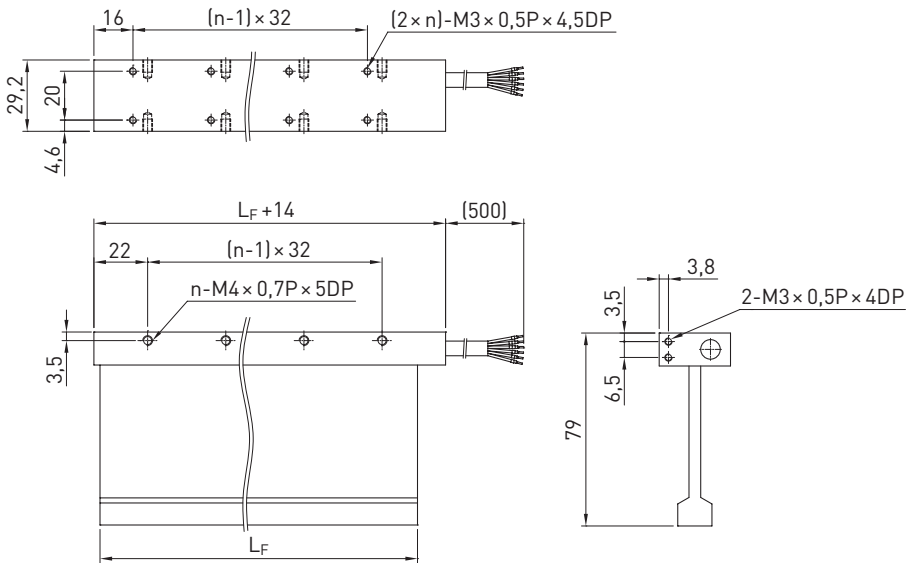
<sup>1)</sup> Line to line

Table 4.4 LMCB motor cable assignment

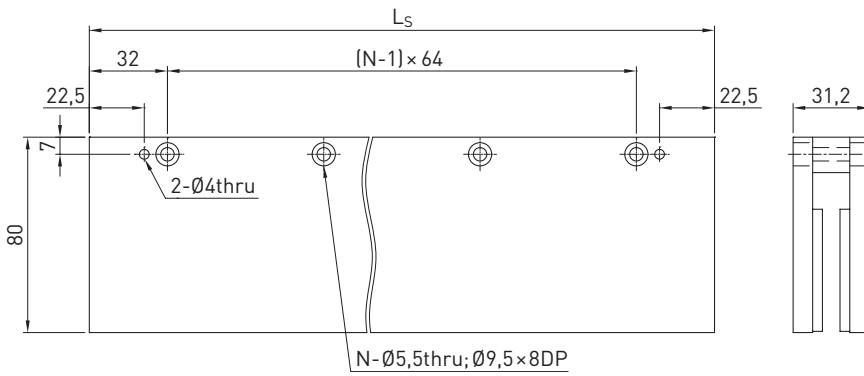
Motor cable	Signal	Diameter [mm]
Brown	U	7.5
White	V	
Grey	W	
Black	GND	
Yellow	T+	
Green	T-	



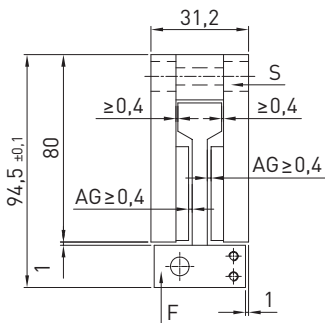
**Dimensions of forcer**



**Dimensions of stator**



**Mounting tolerances**



- F Forcer
- S Stator
- AG Air gap

# Linear Motors & Distance Measuring Systems

HIWIN LMC linear motors

## 4.4.3 LMCC linear motor specifications

Force-velocity curves (DC bus voltage: 330 VDC)

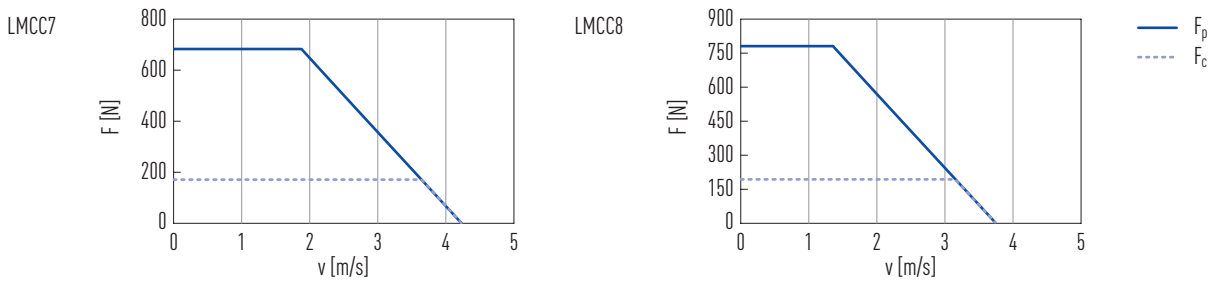


Table 4.5 Technical data for LMCC

	Symbol	Unit	LMCC7	LMCC8
<b>Forces and electrical parameters</b>				
Continuous force at $T_{max}$	$F_c$	N	171	195
Continuous current at $T_{max}$	$I_c$	$A_{eff}$	2.0	2.0
Peak force (for 1 s)	$F_p$	N	684	780
Peak current (for 1 s)	$I_p$	$A_{eff}$	8.0	8.0
Force constant	$K_f$	$N/A_{eff}$	85.4	97.5
Electrical time constant	$K_e$	ms	0.3	0.3
Resistance <sup>1)</sup>	$R_{25}$	$\Omega$	15.8	18.2
Inductance <sup>1)</sup>	$L$	mH	5.5	6.3
Back EMF constant	$K_u$	$V_{eff}/(m/s)$	45.4	51.9
Motor constant	$K_m$	$N/\sqrt{W}$	17.6	18.7
Thermal resistance	$R_{th}$	$^{\circ}C/W$	0.63	0.55
Thermal switch			3 PTC SNM 100 in series	
Max. DC bus voltage		V	330	
<b>Mechanical parameters</b>				
Max. bending radius of motor cable	$R_{bend}$	mm	37.5	
Pole pair pitch	$2\tau$	mm	32	
Max. winding temperature	$T_{max}$	$^{\circ}C$	100	
Mounting holes (forcer)	$n$		7	8
Weight of forcer	$M_f$	kg	0.74	0.76
Length of forcer	$L_f$	mm	226	258
Unit mass of stator	$M_s$	kg/m	21	
Stator length/mounting holes	$L_s$	mm	128 mm/N = 2; 320 mm/N = 5	

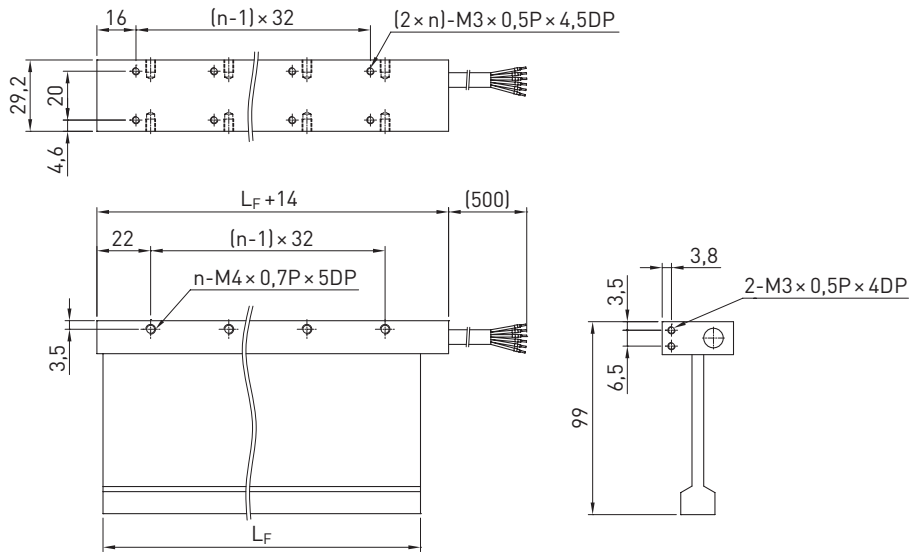
All specifications are in  $\pm 10\%$  of tolerance at  $25^{\circ}C$  ambient temperature

<sup>1)</sup> Line to line

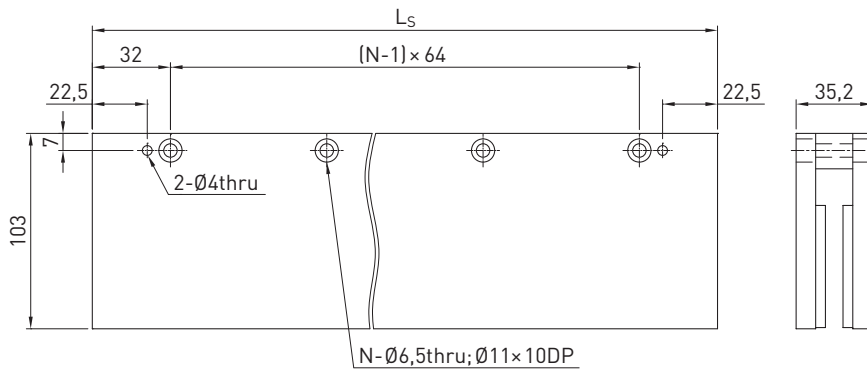
Table 4.6 LMCC motor cable assignment

Motor cable	Signal	Diameter [mm]
Brown	U	7.5
White	V	
Grey	W	
Black	GND	
Yellow	T+	
Green	T-	

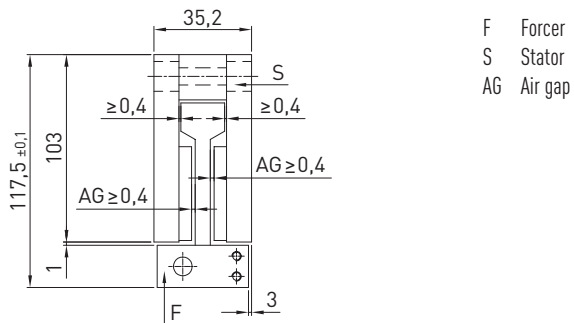
**Dimensions of forcer**



**Dimensions of stator**



**Mounting tolerances**



# Linear Motors & Distance Measuring Systems

HIWIN LMC linear motors

## 4.4.4 LMCE linear motor specifications

Force-velocity curves (DC bus voltage: 330 VDC)

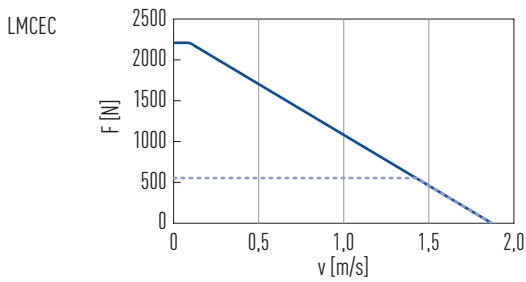
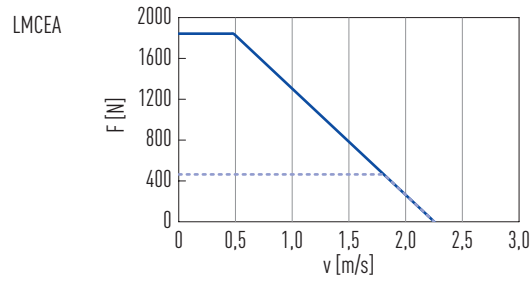
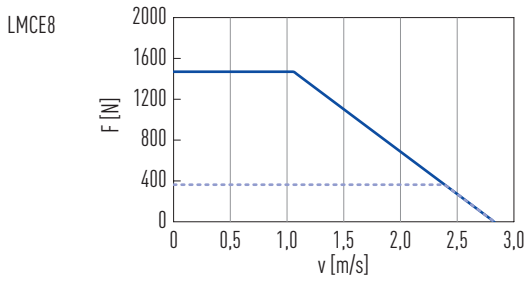
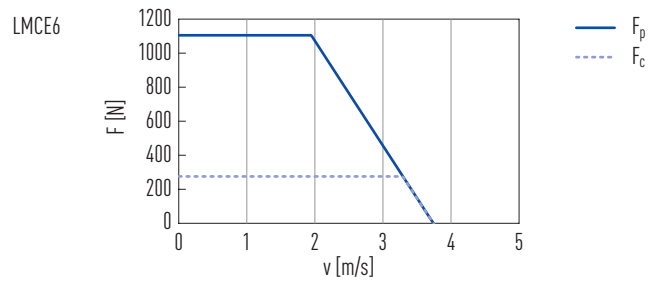
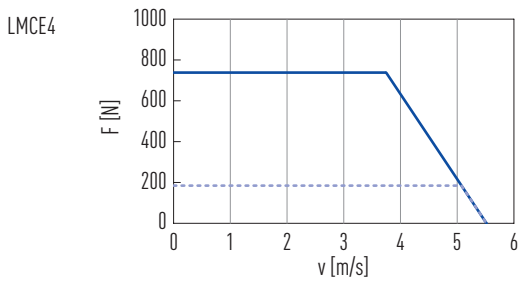


Table 4.7 Technical data for LMCE

	Symbol	Unit	LMCE4	LMCE6	LMCE8	LMCEA	LMCEC
<b>Forces and electrical parameters</b>							
Continuous force at $T_{max}$	$F_c$	N	184	276	368	460	552
Continuous current at $T_{max}$	$I_c$	$A_{eff}$	3.25	3.25	3.25	3.25	3.25
Peak force (for 1 s)	$F_p$	N	736	1,104	1,472	1,840	2,208
Peak current (for 1 s)	$I_p$	$A_{eff}$	13	13	13	13	13
Force constant	$K_f$	$N/A_{eff}$	56.6	84.9	113.2	141.5	169.8
Electrical time constant	$K_e$	ms	0.5	0.5	0.5	0.5	0.5
Resistance <sup>1)</sup>	$R_{25}$	$\Omega$	5.6	8.4	11.0	13.8	16.7
Inductance <sup>1)</sup>	L	mH	2.9	4.4	5.9	7.3	8.8
Back EMF constant	$K_u$	$V_{eff}/(m/s)$	35	53	70	88	106
Motor constant	$K_m$	$N/\sqrt{W}$	19.1	23.4	27.0	30.2	33.2
Thermal resistance	$R_{th}$	$^{\circ}C/W$	0.68	0.45	0.34	0.27	0.23
Thermal switch			3 PTC SNM 100 in series				
Max. DC bus voltage		V	330				
<b>Mechanical parameters</b>							
Max. bending radius of motor cable	$R_{bend}$	mm	37.5				
Pole pair pitch	$2\tau$	mm	60				
Max. winding temperature	$T_{max}$	$^{\circ}C$	100				
Mounting holes (forcer)	n		7	10	13	16	19
Weight of forcer	$M_F$	kg	1.23	1.84	2.46	3.08	3.70
Length of forcer	$L_F$	mm	260	380	500	620	740
Unit mass of stator	$M_S$	kg/m	20				
Stator length/mounting holes	$L_S$	mm	120 mm/N = 2; 300 mm/N = 5				

All specifications are in  $\pm 10\%$  of tolerance at  $25^{\circ}C$  ambient temperature

<sup>1)</sup> Line to line

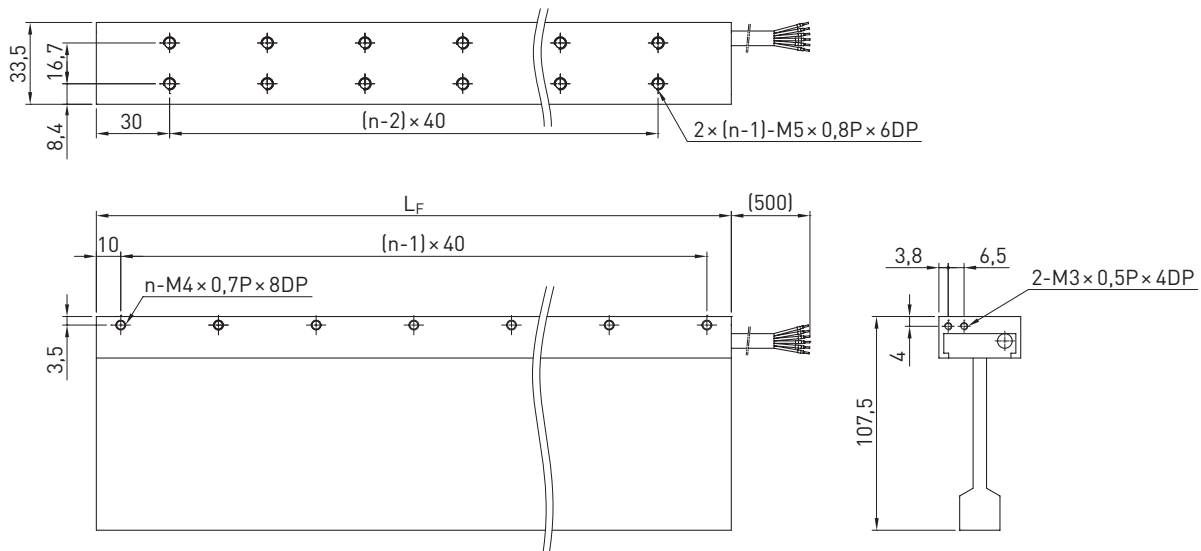
Table 4.8 LMCE motor cable assignment

Motor cable	Signal	Diameter [mm]
Brown	U	7.5
White	V	
Grey	W	
Black	GND	
Yellow	T+	
Green	T-	

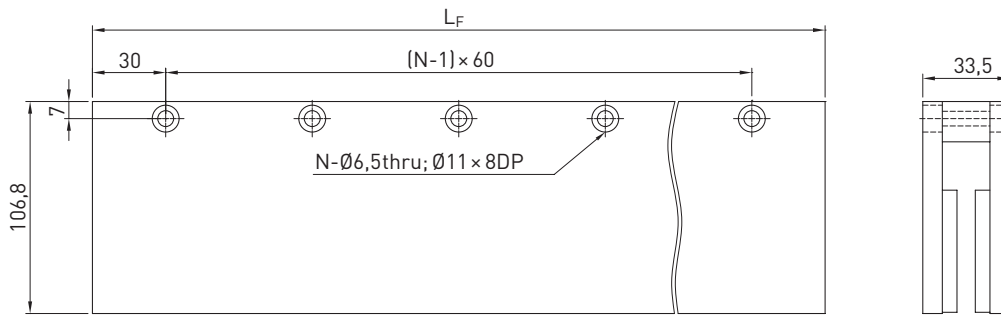
# Linear Motors & Distance Measuring Systems

HIWIN LMC linear motors

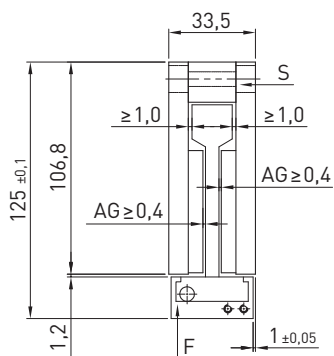
## Dimensions of forcer



## Dimensions of stator



## Mounting tolerances



F Forcer  
S Stator  
AG Air gap

## 5. HIWIN LMFA linear motors

### 5.1 Special characteristics of the LMFA linear motors

The HIWIN LMFA synchronous linear motors are the cooled power packs of linear actuators. The UL-certified motors are fitted with a highly efficient cooling system. This enables even higher continuous forces and due to forced cooling, no additional process heat is introduced during machine construction. The linear motors in the LMFA series achieve extremely high thrust and acceleration. In addition, an extremely high synchronism is achieved through the optimised configuration of the permanent magnets in the stator. The benefits of the LMFA linear motors make them the preferred choice in fields with very high loads as well as in applications in which no additional process heat must be introduced.



#### Key features of the LMFA linear motors:

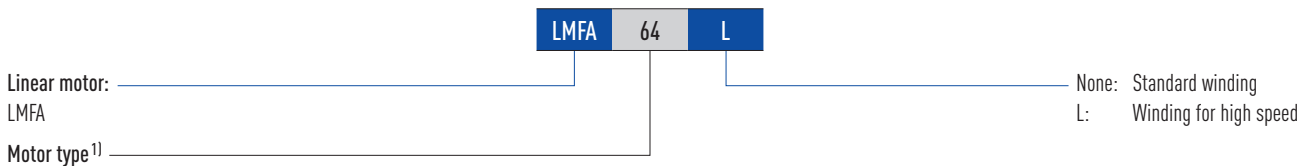
- Efficient cooling system
- Extremely high thrust
- High acceleration
- UL-certified
- High synchronous run
- Full epoxy encapsulation of permanent magnets in the stator
- Optional: version with Hall sensor

#### Typical fields of application of the LMFA linear motors:

- Machine tools
- Portal milling machines
- Sheet metal forming machines

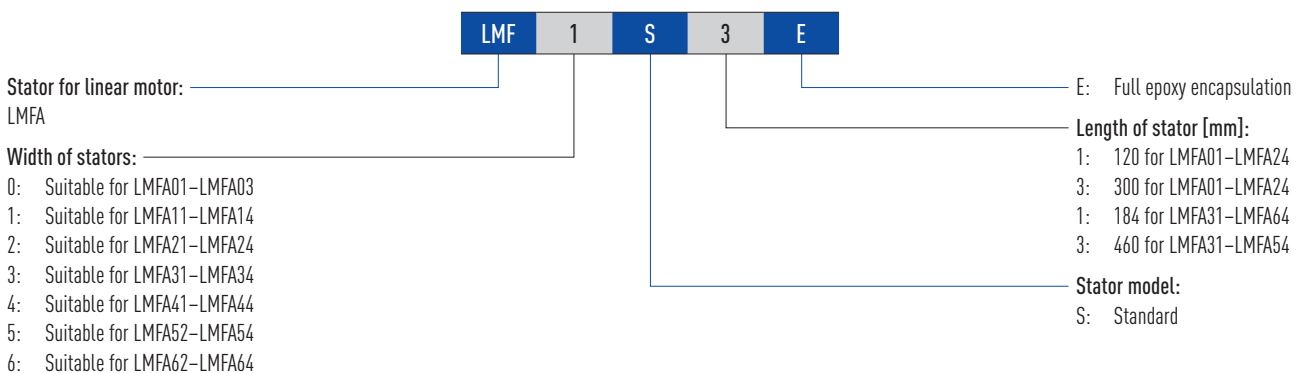
### 5.2 Order code LMFA linear motors

#### 5.2.1 Order code of primary part (forcer)



<sup>1)</sup> See [Table 5.1 \(LMFA0\)](#), [Table 5.2 \(LMFA1\)](#), [Table 5.3 \(LMFA2\)](#), [Table 5.4 \(LMFA3\)](#), [Table 5.5 \(LMFA4\)](#), [Table 5.6 \(LMFA5\)](#), [Table 5.7 \(LMFA6\)](#)

#### 5.2.2 Order code of magnet track (stator)

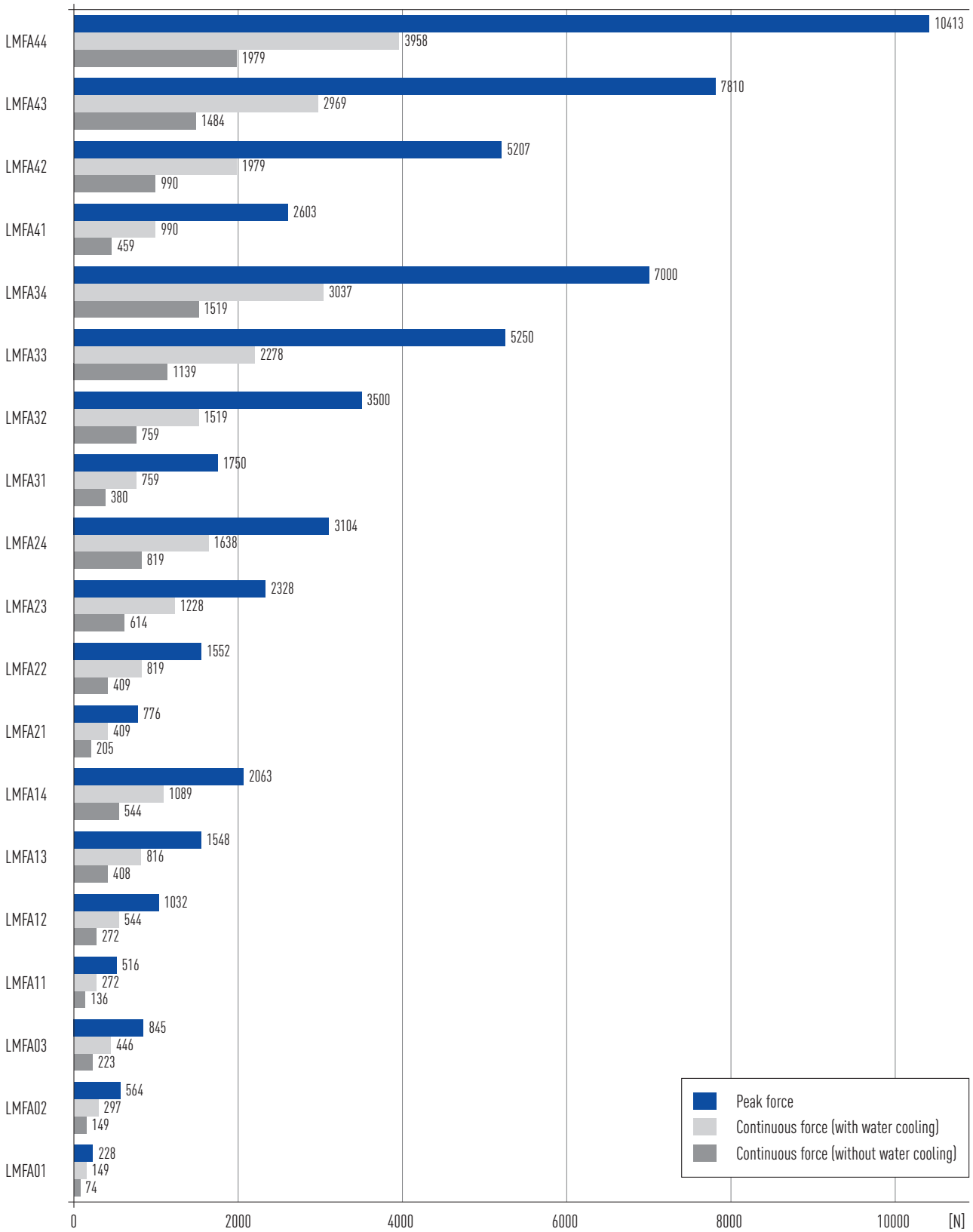


# Linear Motors & Distance Measuring Systems

HIWIN LMFA linear motors

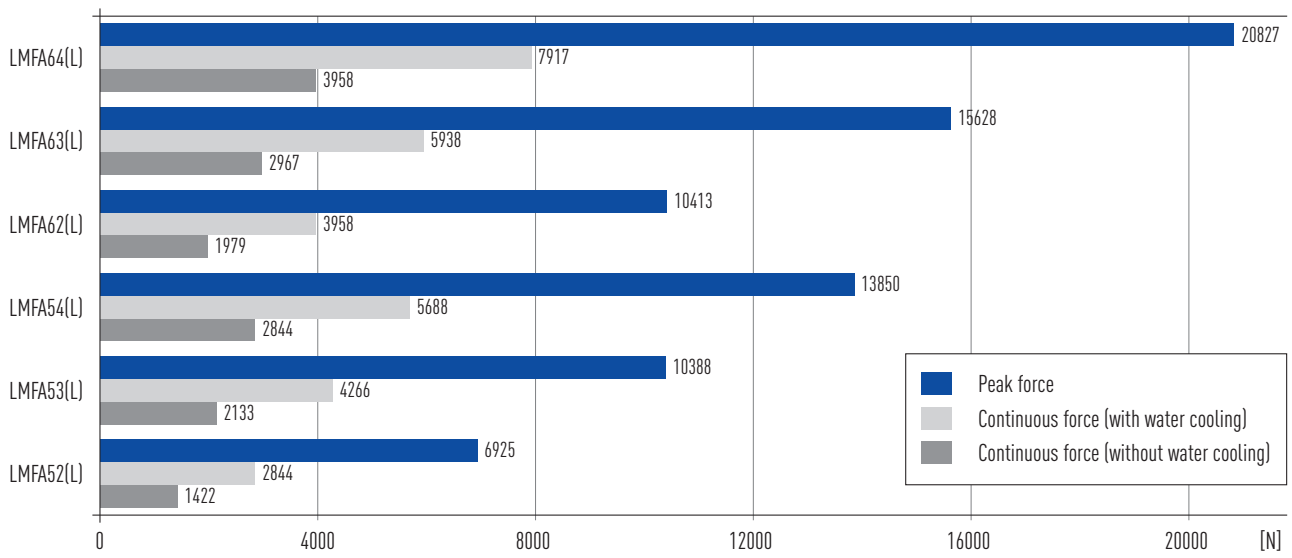
## 5.3 Force chart for LMFA linear motors

Force chart for linear motors LMFA0, LMFA1, LMFA2, LMFA3, LMFA4





Force chart for linear motors LMFA5, LMFA6



# Linear Motors & Distance Measuring Systems

HIWIN LMFA linear motors

## 5.4 LMFA linear motor specifications

### 5.4.1 LMFA0 linear motor specifications

Force-velocity curves (DC bus voltage: 750 VDC)

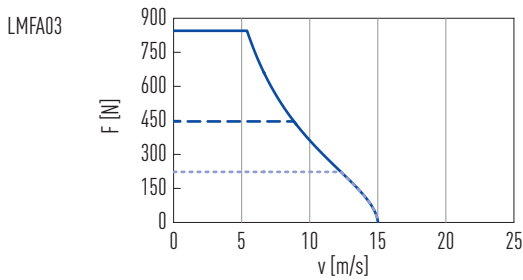
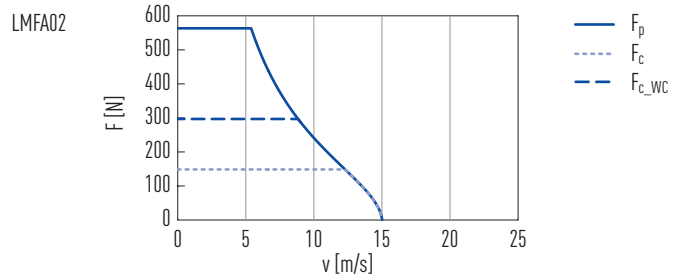
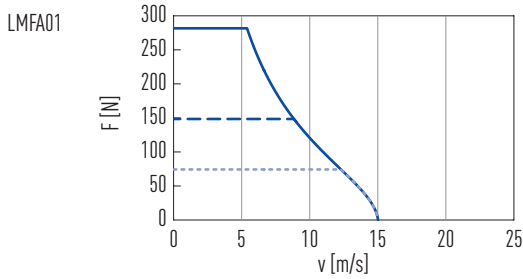


Table 5.1 Technical data for LMFA0

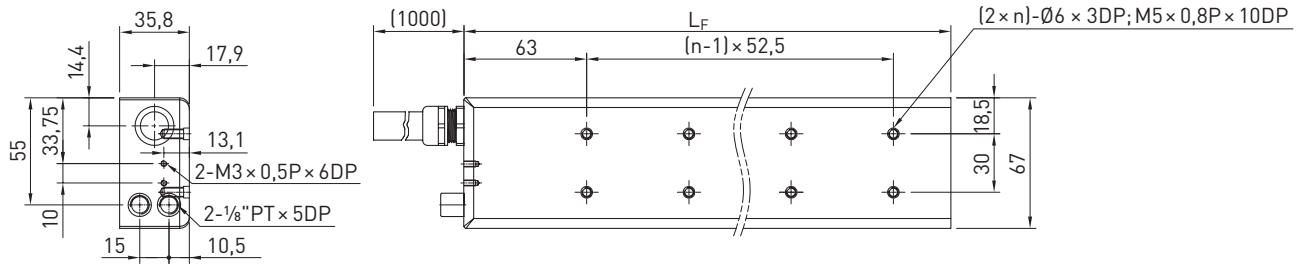
	Symbol	Unit	LMFA01	LMFA02	LMFA03
<b>Forces and electrical parameters</b>					
Continuous force at $T_{max}$	$F_c$	N	74	149	223
Peak force at $T_{max}$ (WC)	$F_{c\_WC}$	N	149	297	446
Continuous current at $T_{max}$	$I_c$	$A_{eff}$	1.4	2.7	4.1
Continuous current at $T_{max}$ (WC)	$I_{c\_WC}$	$A_{eff}$	2.7	5.4	8.1
Peak force (for 1 s)	$F_p$	N	282	564	845
Peak current (for 1 s)	$I_p$	$A_{eff}$	8.4	16.7	25.1
Force constant	$K_f$	$N/A_{eff}$	55.1	55.1	55.1
Attraction force	$F_a$	N	457	914	1,372
Electrical time constant	$K_e$	ms	7.2	7.2	7.2
Resistance <sup>1)</sup>	$R_{25}$	$\Omega$	11.7	5.9	3.9
Inductance <sup>1)</sup>	$L$	mH	84.2	42.1	28.1
Back EMF constant	$K_u$	$V_{eff}/(m/s)$	31.8	31.8	31.8
Motor constant	$K_m$	$N/\sqrt{W}$	13.1	18.6	22.8
Thermal resistance	$R_{th}$	$^{\circ}C/W$	2.25	1.13	0.75
Thermal resistance (WC)	$R_{th\_WC}$	$^{\circ}C/W$	0.56	0.28	0.19
Thermal switch			1 × PT1000 + 1 × (3 PTC SNM 120 in series)		
Max. DC bus voltage		V	750		
<b>Mechanical parameters</b>					
Pole pair pitch	$2\tau$	mm	30		
Max. winding temperature	$T_{max}$	$^{\circ}C$	120		
Mounting holes (forcer)	$n$		2	4	6
Weight of forcer	$M_F$	kg	1.5	2.3	3.1
Length of forcer	$L_F$	mm	145	250	355
Unit mass of stator	$M_S$	kg/m	3.7		
Stator length/mounting holes	$L_S$	mm	120 mm/N = 2; 300 mm/N = 5		

WC: with water cooling

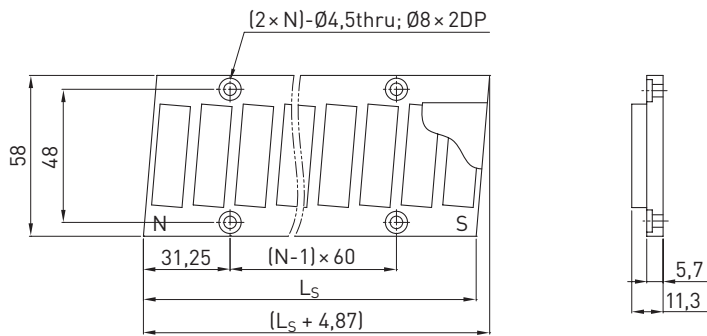
All specifications are in  $\pm 10\%$  of tolerance at 25  $^{\circ}C$  ambient temperature

<sup>1)</sup> Line to line

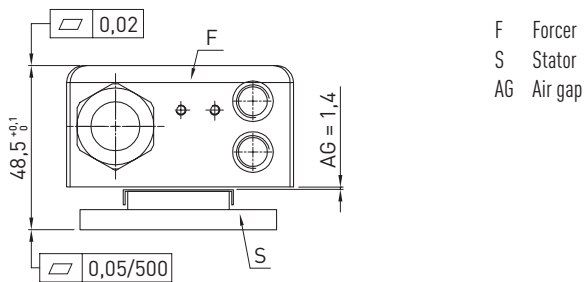
**Dimensions of forcer**



**Dimensions of stator**



**Mounting tolerances**



**Stator versions available**



Epoxy: Full epoxy encapsulation of permanent magnets

Stainless steel cover plate (upon request):  
Additional stainless steel cover plate for magnet tracks

# Linear Motors & Distance Measuring Systems

HIWIN LMFA linear motors

## 5.4.2 LMFA1 linear motor specifications

Force-velocity curves (DC bus voltage: 750 VDC)

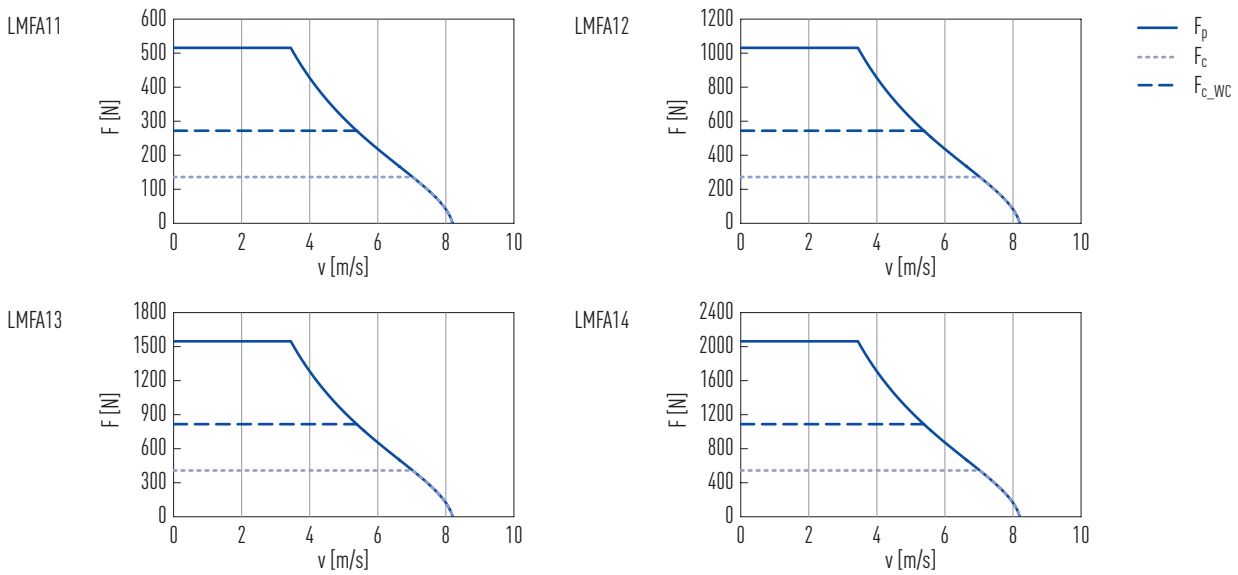


Table 5.2 Technical data for LMFA1

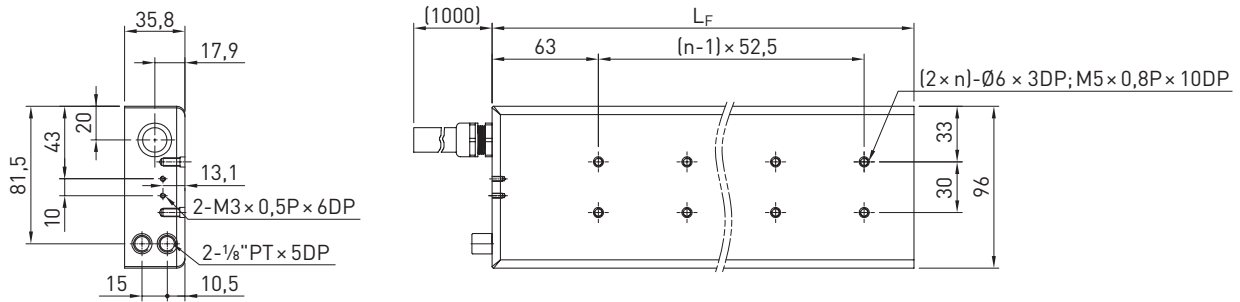
	Symbol	Unit	LMFA11	LMFA12	LMFA13	LMFA14
<b>Forces and electrical parameters</b>						
Continuous force at $T_{max}$	$F_c$	N	136	272	408	544
Continuous force at $T_{max}$ (WC)	$F_{c\_WC}$	N	272	544	816	1,089
Continuous current at $T_{max}$	$I_c$	$A_{eff}$	1.4	2.7	4.0	5.4
Continuous current at $T_{max}$ (WC)	$I_{c\_WC}$	$A_{eff}$	2.7	5.4	8.1	10.8
Peak force (for 1 s)	$F_p$	N	516	1,032	1,548	2,063
Peak current (for 1 s)	$I_p$	$A_{eff}$	8.4	16.7	25.1	33.5
Force constant	$K_f$	$N/A_{eff}$	100.8	100.8	100.8	100.8
Attraction force	$F_a$	N	837	1,674	2,511	3,348
Electrical time constant	$K_e$	ms	7.2	7.2	7.2	7.2
Resistance <sup>1)</sup>	$R_{25}$	$\Omega$	16.9	8.4	5.6	4.2
Inductance <sup>1)</sup>	$L$	mH	121.9	60.9	40.6	30.5
Back EMF constant	$K_u$	$V_{eff}/(m/s)$	58.2	58.2	58.2	58.2
Motor constant	$K_m$	$N/\sqrt{W}$	20.0	28.3	34.7	40.1
Thermal resistance	$R_{th}$	$^{\circ}C/W$	1.56	0.78	0.52	0.39
Thermal resistance (WC)	$R_{th\_WC}$	$^{\circ}C/W$	0.39	0.20	0.13	0.10
Thermal switch			1 $\times$ PT1000 + 1 $\times$ (3 PTC SNM 120 in series)			
Max. DC bus voltage		V	750			
<b>Mechanical parameters</b>						
Pole pair pitch	$2\tau$	mm	30			
Max. winding temperature	$T_{max}$	$^{\circ}C$	120			
Mounting holes (forcer)	$n$		2	4	6	8
Weight of forcer	$M_F$	kg	2.4	4.0	5.6	7.6
Length of forcer	$L_F$	mm	145	250	355	460
Unit mass of stator	$M_S$	kg/m	5.8			
Stator length/mounting holes	$L_S$	mm	120 mm/N = 2; 300 mm/N = 5			

WC: with water cooling

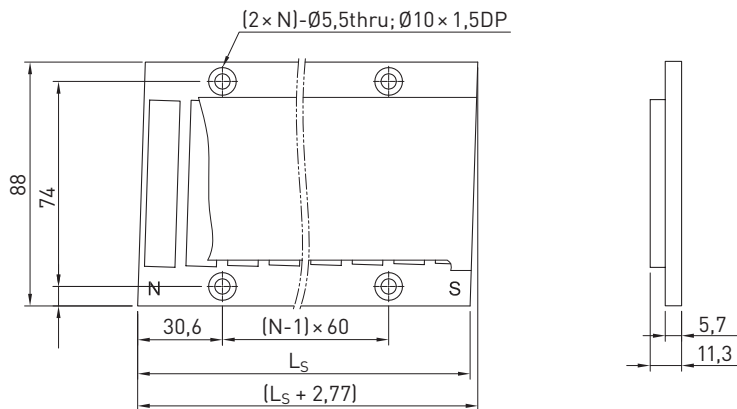
All specifications are in  $\pm 10\%$  of tolerance at  $25^{\circ}C$  ambient temperature

<sup>1)</sup> Line to line

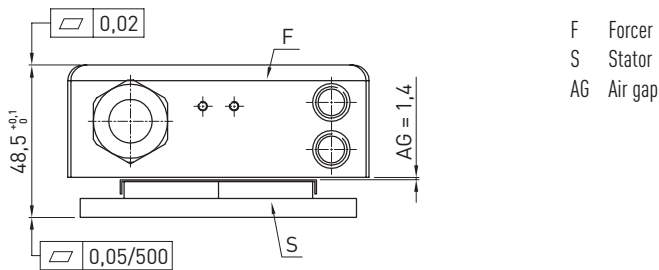
**Dimensions of forcer**



**Dimensions of stator**



**Mounting tolerances**



**Stator versions available**



Epoxy: Full epoxy encapsulation of permanent magnets

Stainless steel cover plate (upon request):  
Additional stainless steel cover plate for magnet tracks

# Linear Motors & Distance Measuring Systems

HIWIN LMFA linear motors

## 5.4.3 LMFA2 linear motor specifications

Force-velocity curves (DC bus voltage: 750 VDC)

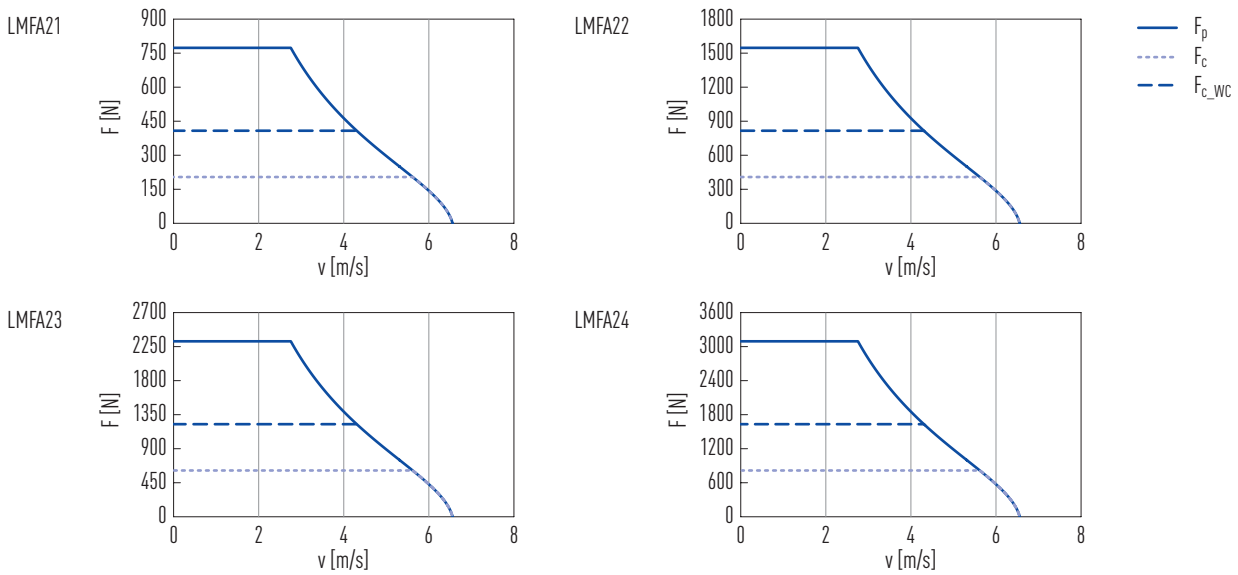


Table 5.3 Technical data for LMFA2

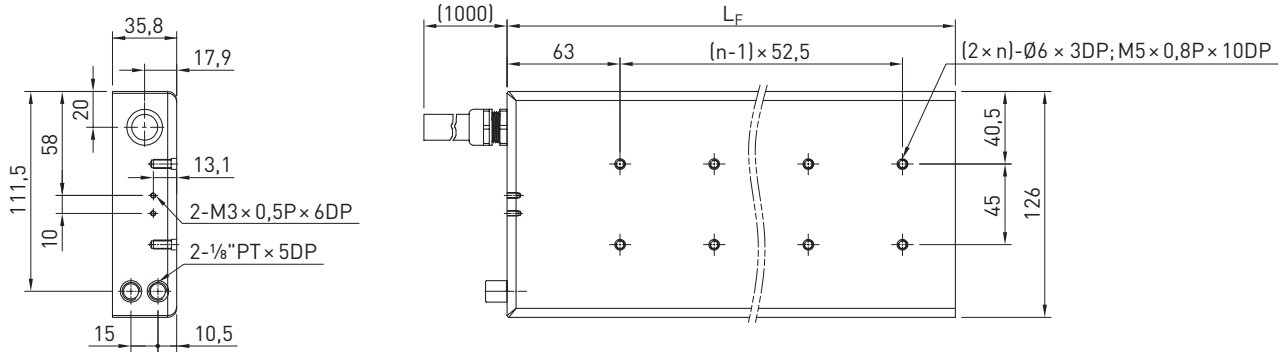
	Symbol	Unit	LMFA21	LMFA22	LMFA23	LMFA24
<b>Forces and electrical parameters</b>						
Continuous force at $T_{max}$	$F_c$	N	205	409	614	819
Continuous force at $T_{max}$ (WC)	$F_{c\_WC}$	N	409	819	1,228	1,638
Continuous current at $T_{max}$	$I_c$	$A_{eff}$	1.4	2.7	4.1	5.4
Continuous current at $T_{max}$ (WC)	$I_{c\_WC}$	$A_{eff}$	2.7	5.4	8.1	10.8
Peak force (for 1 s)	$F_p$	N	776	1,552	2,328	3,104
Peak current (for 1 s)	$I_p$	$A_{eff}$	8.4	16.7	25.1	33.5
Force constant	$K_f$	$N/A_{eff}$	151.6	151.6	151.6	151.6
Attraction force	$F_a$	N	1,259	2,518	3,777	5,036
Electrical time constant	$K_e$	ms	7.2	7.2	7.2	7.2
Resistance <sup>1)</sup>	$R_{25}$	$\Omega$	24.8	12.4	8.3	6.2
Inductance <sup>1)</sup>	$L$	mH	178.6	89.3	59.5	44.6
Back EMF constant	$K_u$	$V_{eff}/(m/s)$	87.5	87.5	87.5	87.5
Motor constant	$K_m$	$N/\sqrt{W}$	24.9	35.2	43.1	49.7
Thermal resistance	$R_{th}$	$^{\circ}C/W$	1.06	0.53	0.35	0.27
Thermal resistance (WC)	$R_{th\_WC}$	$^{\circ}C/W$	0.27	0.13	0.09	0.07
Thermal switch			1 × PT1000 + 1 × (3 PTC SNM 120 in series)			
Max. DC bus voltage		V	750			
<b>Mechanical parameters</b>						
Pole pair pitch	$2\tau$	mm	30			
Max. winding temperature	$T_{max}$	$^{\circ}C$	120			
Mounting holes (forcer)	$n$		2	4	6	8
Weight of forcer	$M_F$	kg	3.2	5.5	8.0	10.4
Length of forcer	$L_F$	mm	145	250	355	460
Unit mass of stator	$M_S$	kg/m	9.8			
Stator length/mounting holes	$L_S$	mm	120 mm/N = 2; 300 mm/N = 5			

WC: with water cooling

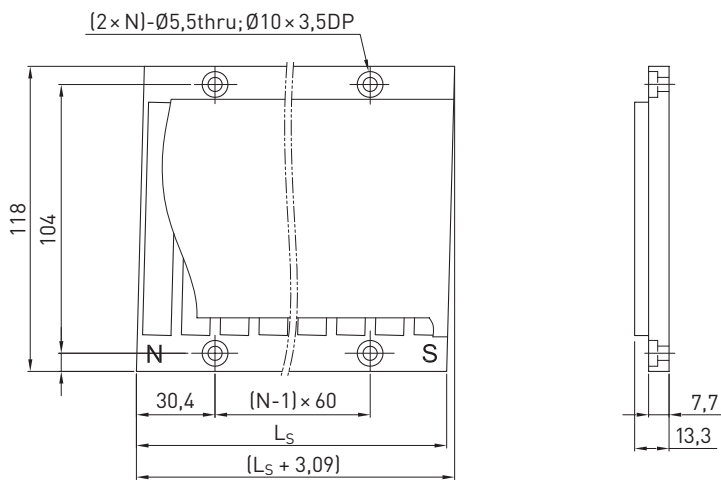
All specifications are in  $\pm 10\%$  of tolerance at 25  $^{\circ}C$  ambient temperature

<sup>1)</sup> Line to line

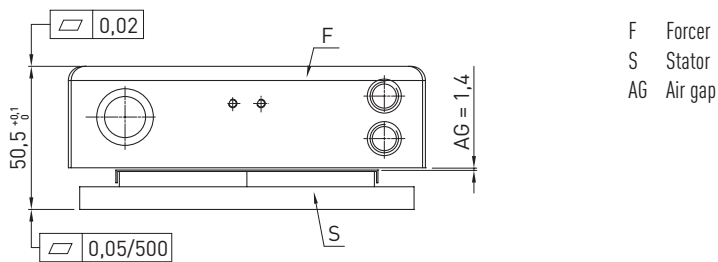
**Dimensions of forcer**



**Dimensions of stator**



**Mounting tolerances**



**Stator versions available**



Epoxy: Full epoxy encapsulation of permanent magnets

Stainless steel cover plate (upon request):  
Additional stainless steel cover plate for magnet tracks

# Linear Motors & Distance Measuring Systems

HIWIN LMFA linear motors

## 5.4.4 LMFA3 linear motor specifications

Force-velocity curves (DC bus voltage: 750 VDC)

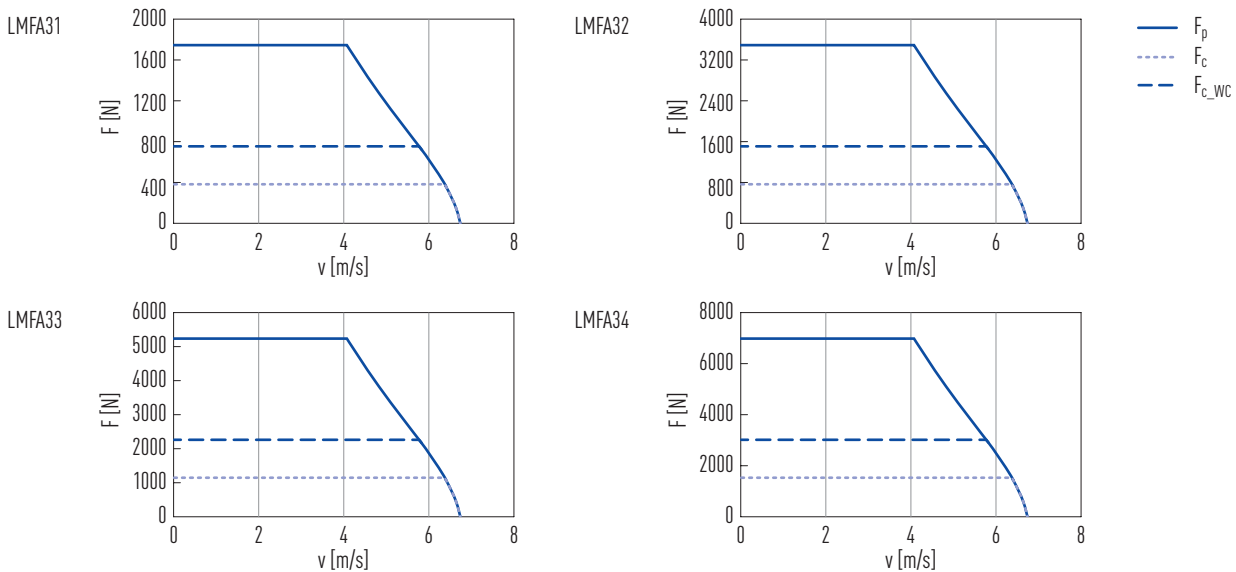


Table 5.4 Technical data for LMFA3

	Symbol	Unit	LMFA31	LMFA32	LMFA33	LMFA34
<b>Forces and electrical parameters</b>						
Continuous force at $T_{max}$	$F_c$	N	380	759	1,139	1,519
Continuous force at $T_{max}$ (WC)	$F_{c\_WC}$	N	759	1,519	2,278	3,037
Continuous current at $T_{max}$	$I_c$	$A_{eff}$	3.1	6.2	9.3	12.4
Continuous current at $T_{max}$ (WC)	$I_{c\_WC}$	$A_{eff}$	6.2	12.4	18.6	24.7
Peak force (for 1 s)	$F_p$	N	1,750	3,500	5,250	7,000
Peak current (for 1 s)	$I_p$	$A_{eff}$	19.2	38.4	57.5	76.7
Force constant	$K_f$	$N/A_{eff}$	122.7	122.7	122.7	122.7
Attraction force	$F_a$	N	3,430	6,860	10,290	13,720
Electrical time constant	$K_e$	ms	11.3	11.3	11.3	11.3
Resistance <sup>1)</sup>	$R_{25}$	$\Omega$	4.3	2.1	1.4	1.1
Inductance <sup>1)</sup>	$L$	mH	48.3	24.2	16.1	12.1
Back EMF constant	$K_u$	$V_{eff}/(m/s)$	70.9	70.9	70.9	70.9
Motor constant	$K_m$	$N/\sqrt{W}$	48.4	68.5	83.9	96.9
Thermal resistance	$R_{th}$	$^{\circ}C/W$	1.17	0.59	0.39	0.29
Thermal resistance (WC)	$R_{th\_WC}$	$^{\circ}C/W$	0.29	0.15	0.10	0.07
Thermal switch			1 × PT1000 + 1 × (3 PTC SNM 120 in series)			
Max. DC bus voltage		V	750			
<b>Mechanical parameters</b>						
Pole pair pitch	$2\tau$	mm	46			
Max. winding temperature	$T_{max}$	$^{\circ}C$	120			
Mounting holes (forcer)	$n$		2	4	6	8
Weight of forcer	$M_F$	kg	6.4	11.7	17.3	22.5
Length of forcer	$L_F$	mm	214	375	536	697
Unit mass of stator	$M_S$	kg/m	16.2			
Stator length/mounting holes	$L_S$	mm	184 mm/N = 2; 460 mm/N = 5			

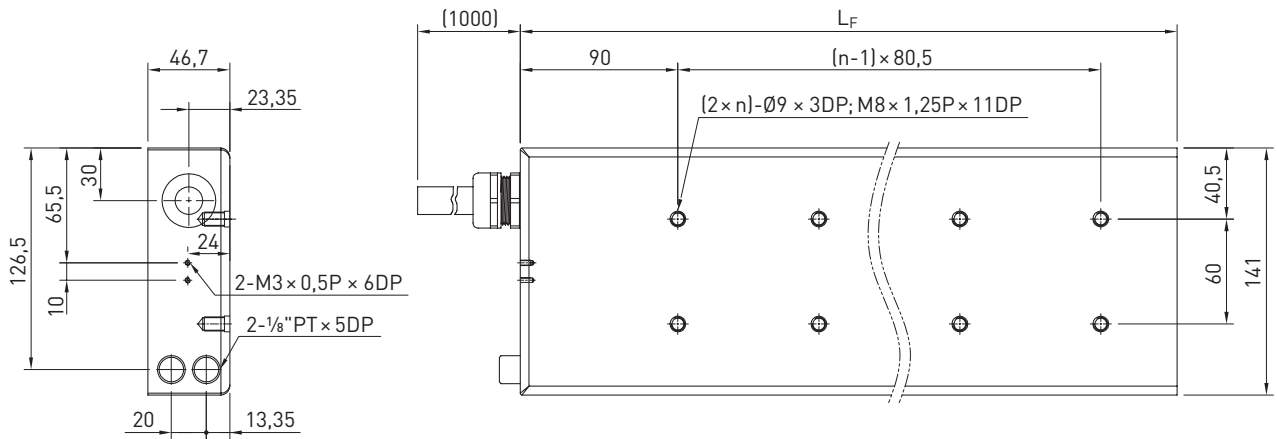
WC: with water cooling

All specifications are in  $\pm 10\%$  of tolerance at 25  $^{\circ}C$  ambient temperature

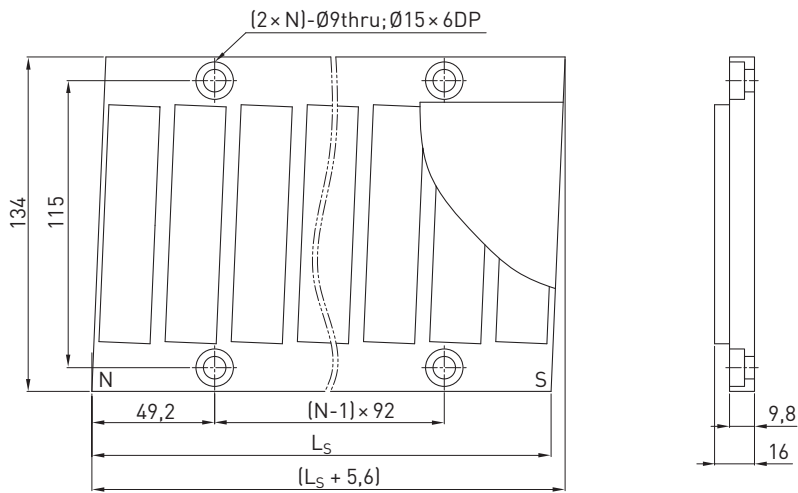
<sup>1)</sup> Line to line



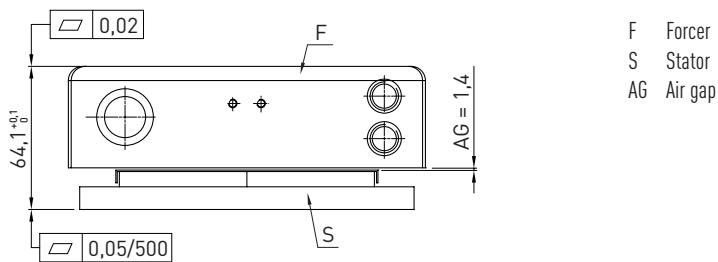
**Dimensions of forcer**



**Dimensions of stator**



**Mounting tolerances**



**Stator versions available**



Epoxy: Full epoxy encapsulation of permanent magnets

Stainless steel cover plate (upon request):  
Additional stainless steel cover plate for magnet tracks

# Linear Motors & Distance Measuring Systems

HIWIN LMFA linear motors

## 5.4.5 LMFA4 linear motor specifications

Force-velocity curves (DC bus voltage: 750 VDC)

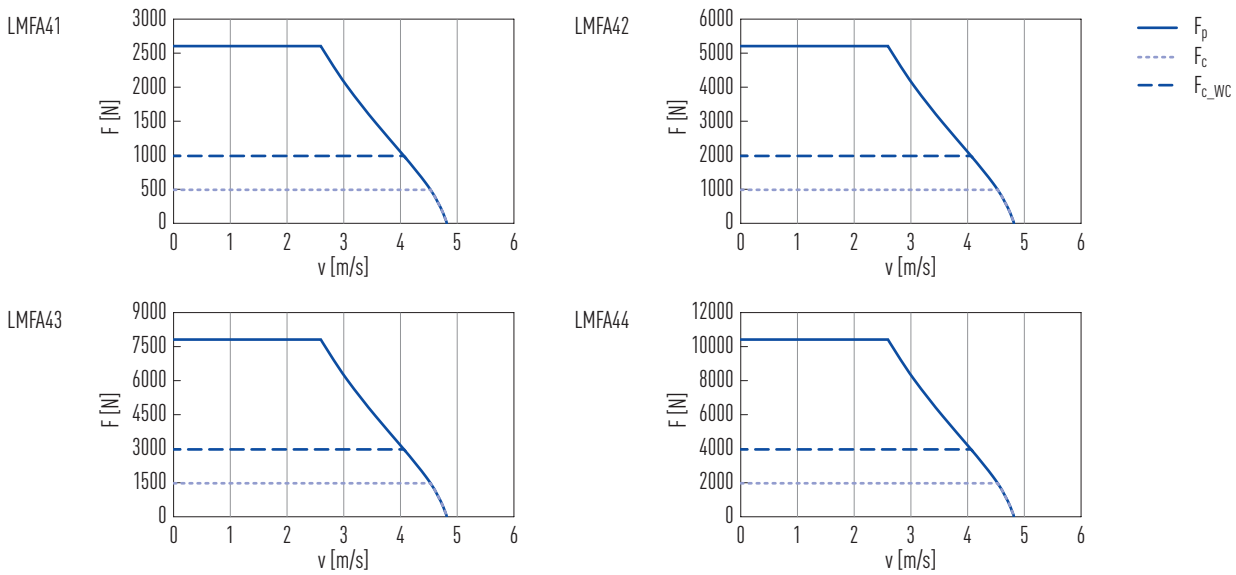


Table 5.5 Technical data for LMFA4

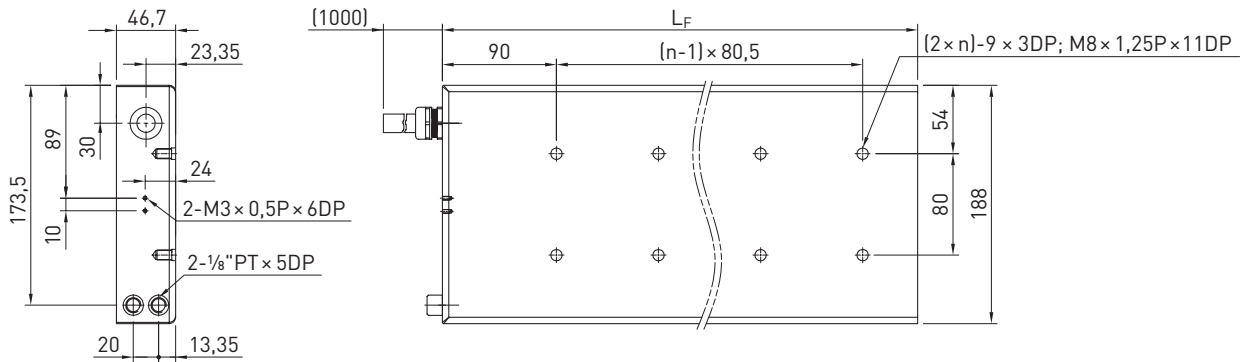
	Symbol	Unit	LMFA41	LMFA42	LMFA43	LMFA44
<b>Forces and electrical parameters</b>						
Continuous force at $T_{max}$	$F_c$	N	495	990	1,484	1,979
Continuous force at $T_{max}$ (WC)	$F_{c\_WC}$	N	990	1,979	2,969	3,958
Continuous current at $T_{max}$	$I_c$	$A_{eff}$	2.9	5.8	8.7	11.5
Continuous current at $T_{max}$ (WC)	$I_{c\_WC}$	$A_{eff}$	5.8	11.5	17.3	23.1
Peak force (for 1 s)	$F_p$	N	2,603	5,207	7,810	10,413
Peak current (for 1 s)	$I_p$	$A_{eff}$	17.9	35.8	53.5	71.6
Force constant	$K_f$	$N/A_{eff}$	171.4	171.4	171.4	171.4
Attraction force	$F_a$	N	5,145	10,290	15,435	20,580
Electrical time constant	$K_e$	ms	12.0	12.0	12.0	12.0
Resistance <sup>1)</sup>	$R_{25}$	$\Omega$	6.0	3.0	2.0	1.5
Inductance <sup>1)</sup>	$L$	mH	72.0	36.0	24.0	18.0
Back EMF constant	$K_u$	$V_{eff}/(m/s)$	98.9	98.9	98.9	98.9
Motor constant	$K_m$	$N/\sqrt{W}$	57.1	80.8	98.9	114.2
Thermal resistance	$R_{th}$	$^{\circ}C/W$	0.96	0.48	0.32	0.24
Thermal resistance (WC)	$R_{th\_WC}$	$^{\circ}C/W$	0.24	0.12	0.08	0.06
Thermal switch			1 × PT1000 + 1 × (3 PTC SNM 120 in series)			
Max. DC bus voltage		V	750			
<b>Mechanical parameters</b>						
Pole pair pitch	$2\tau$	mm	46			
Max. winding temperature	$T_{max}$	$^{\circ}C$	120			
Mounting holes (forcer)	$n$		2	4	6	8
Weight of forcer	$M_F$	kg	9.5	16.2	23.0	29.0
Length of forcer	$L_F$	mm	214	375	536	697
Unit mass of stator	$M_S$	kg/m	22.3			
Stator length/mounting holes	$L_S$	mm	184 mm/N = 2; 460 mm/N = 5			

WC: with water cooling

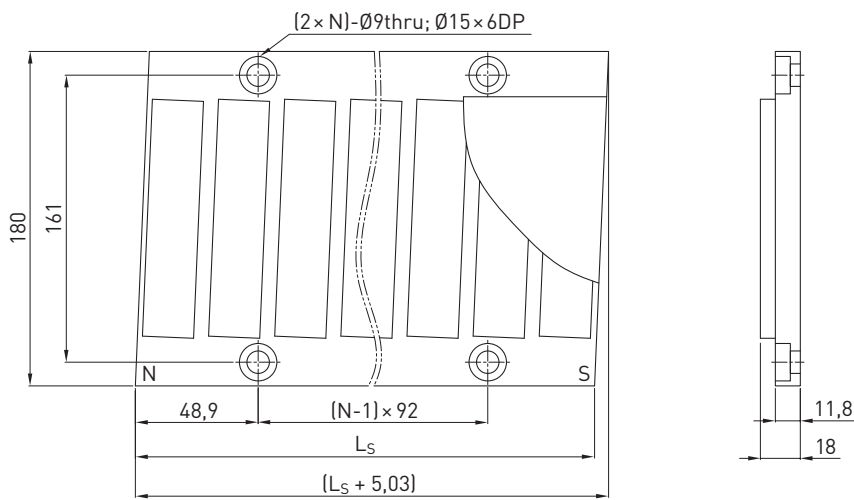
All specifications are in  $\pm 10\%$  of tolerance at 25  $^{\circ}C$  ambient temperature

<sup>1)</sup> Line to line

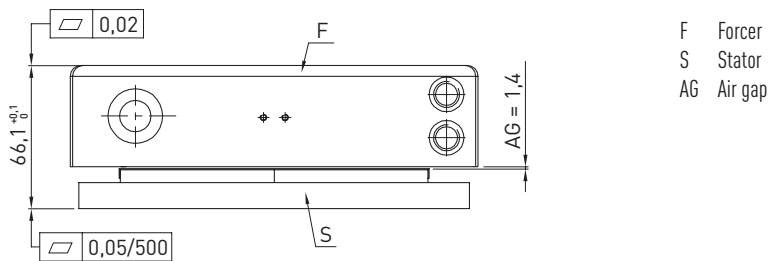
**Dimensions of forcer**



**Dimensions of stator**



**Mounting tolerances**



**Stator versions available**



Epoxy: Full epoxy encapsulation of permanent magnets

Stainless steel cover plate (upon request):  
Additional stainless steel cover plate for magnet tracks

# Linear Motors & Distance Measuring Systems

HIWIN LMFA linear motors

## 5.4.6 LMFA5 linear motor specifications

Force-velocity curves (DC bus voltage: 750 VDC)

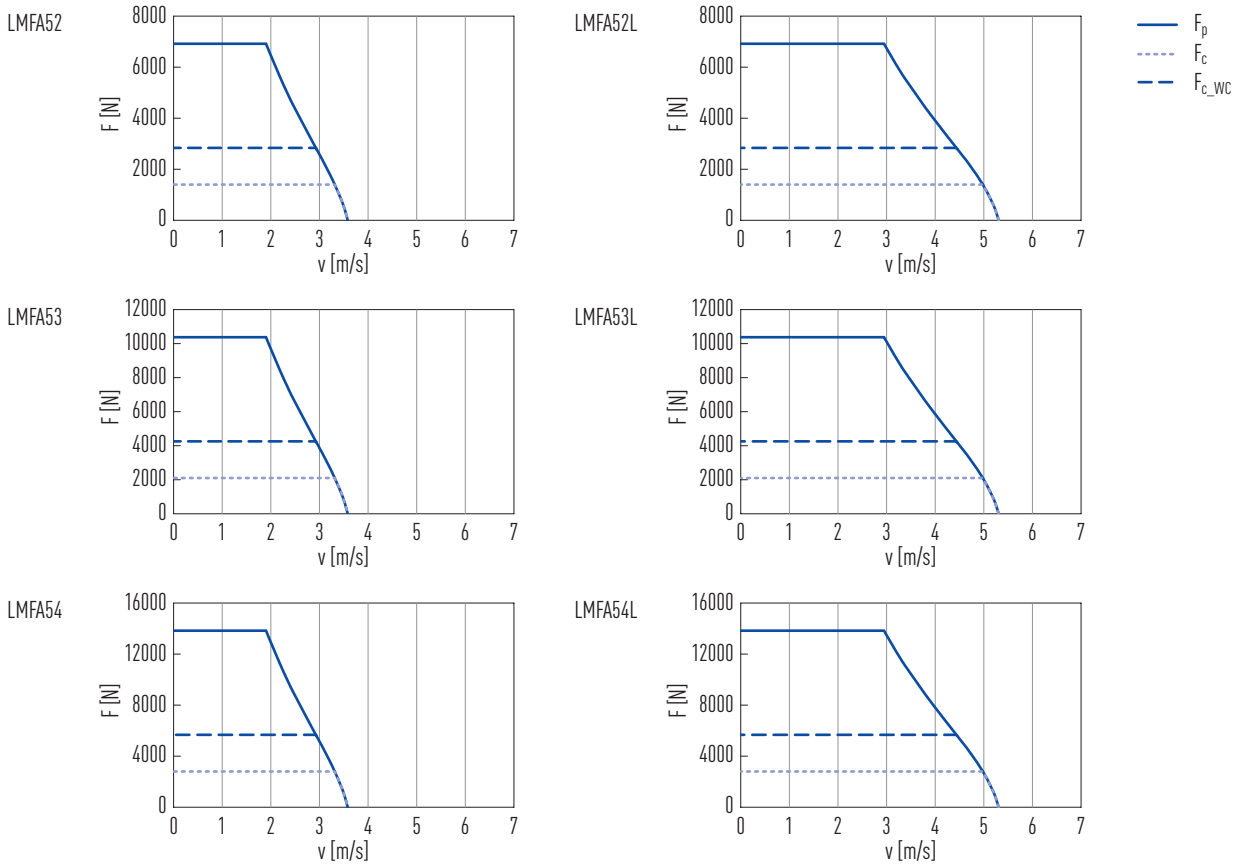


Table 5.6 Technical data for LMFA5

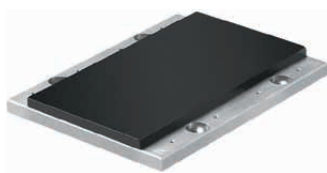
	Symbol	Unit	LMFA52	LMFA52L	LMFA53	LMFA53L	LMFA54	LMFA54L
<b>Forces and electrical parameters</b>								
Continuous force at $T_{max}$	$F_c$	N	1,422		2,133		2,844	
Continuous force at $T_{max}$ (WC)	$F_{c\_WC}$	N	2,844		4,266		5,688	
Continuous current at $T_{max}$	$I_c$	$A_{eff}$	6.2	9.1	9.3	13.7	12.4	18.3
Continuous current at $T_{max}$ (WC)	$I_{c\_WC}$	$A_{eff}$	12.4	18.3	18.6	27.4	24.7	36.5
Peak force (for 1 s)	$F_p$	N	6,925		10,388		13,850	
Peak current (for 1 s)	$I_p$	$A_{eff}$	38.4	56.6	57.5	84.9	76.7	113.2
Force constant	$K_f$	$N/A_{eff}$	229.9	155.7	229.9	155.7	229.9	155.7
Attraction force	$F_a$	N	13,700		20,550		27,400	
Electrical time constant	$K_e$	ms	12.2	12.4	12.2	12.4	12.2	12.4
Resistance <sup>1)</sup>	$R_{25}$	$\Omega$	3.9	1.8	2.6	1.2	2.0	0.9
Inductance <sup>1)</sup>	L	mH	47.7	21.9	31.8	14.6	23.9	10.9
Back EMF constant	$K_u$	$V_{eff}/(m/s)$	132.7	89.9	132.7	89.9	132.7	89.9
Motor constant	$K_m$	$N/\sqrt{W}$	95.0	95.6	116.4	117.1	134.4	135.2
Thermal resistance	$R_{th}$	$^{\circ}C/W$	0.32	0.33	0.21	0.22	0.16	0.16
Thermal resistance (WC)	$R_{th\_WC}$	$^{\circ}C/W$	0.08	0.08	0.05	0.05	0.04	0.04
Thermal switch			1 × PT1000 + 1 × (3 PTC SNM 120 in series)					
Max. DC bus voltage		V	750					
<b>Mechanical parameters</b>								
Pole pair pitch	$2\tau$	mm	46					
Max. winding temperature	$T_{max}$	$^{\circ}C$	120					
Mounting holes (forcer)	n		4		6		8	
Weight of forcer	$M_F$	kg	23.8		32.3		40.8	
Length of forcer	$L_F$	mm	375		536		697	
Unit mass of stator	$M_S$	kg/m	25					
Stator length/mounting holes	$L_S$	mm	184 mm/N = 2; 460 mm/N = 5					

WC: with water cooling

All specifications are in  $\pm 10\%$  of tolerance at 25  $^{\circ}C$  ambient temperature

<sup>1)</sup> Line to line

#### Stator versions available



Epoxy: Full epoxy encapsulation of permanent magnets

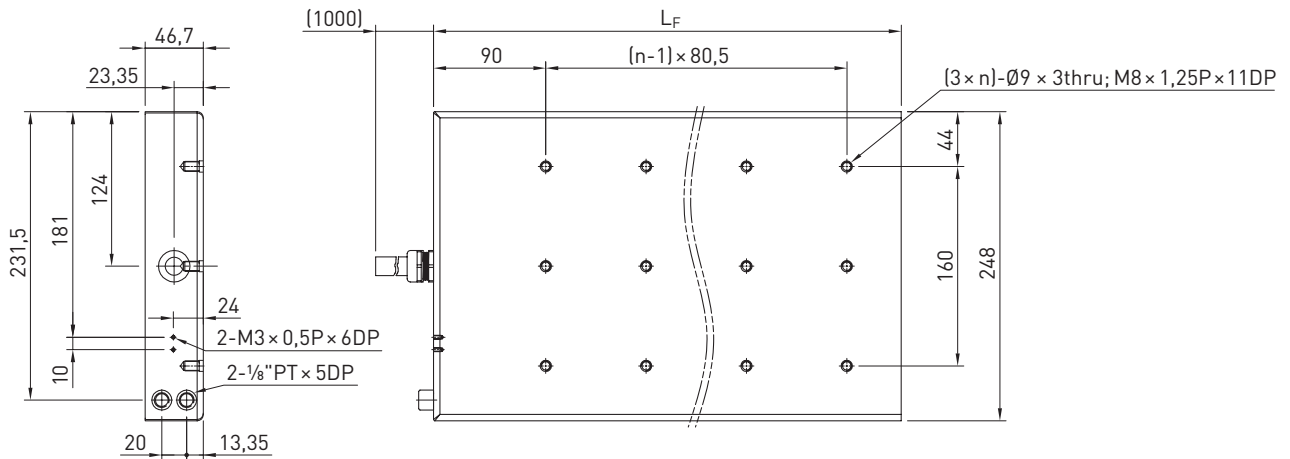


Stainless steel cover plate (upon request):  
Additional stainless steel cover plate for magnet tracks

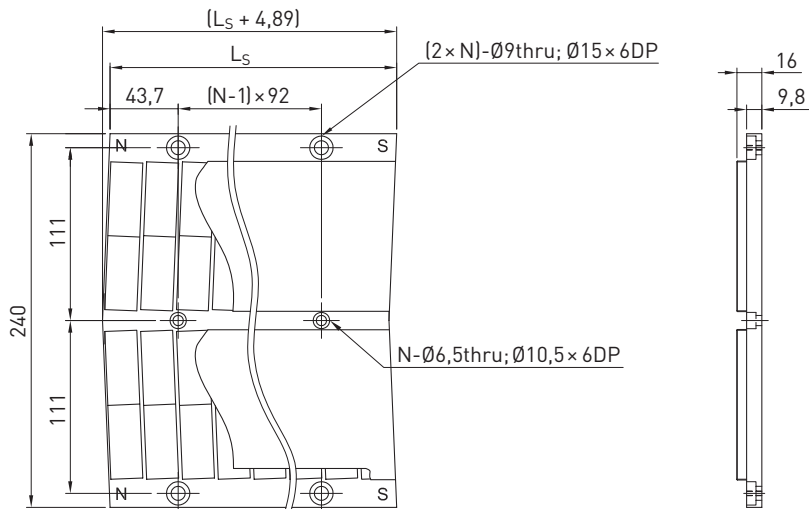
# Linear Motors & Distance Measuring Systems

HIWIN LMFA linear motors

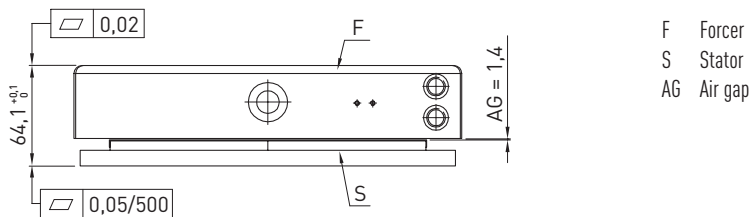
## Dimensions of forcer



## Dimensions of stator

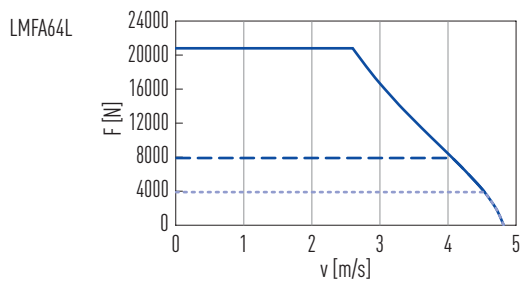
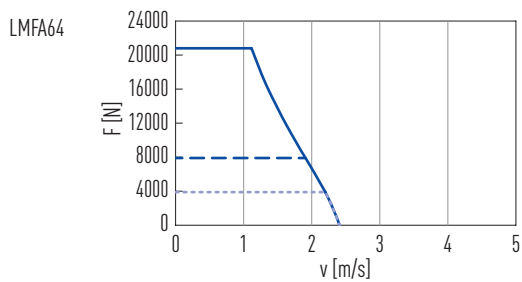
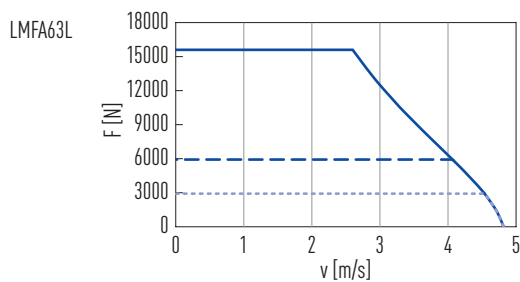
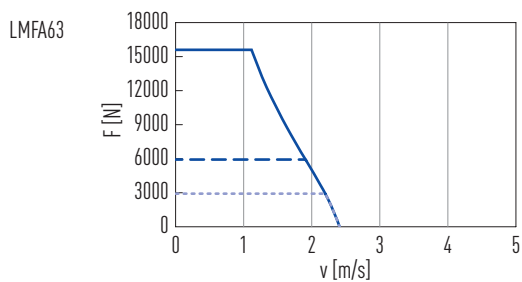
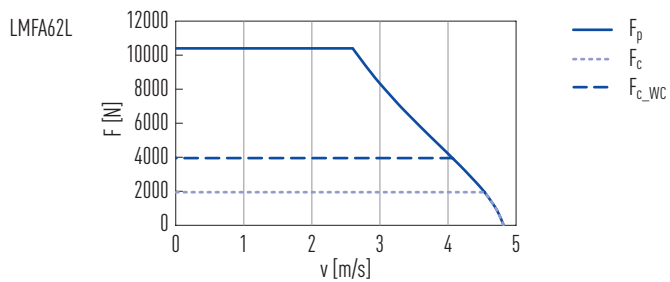
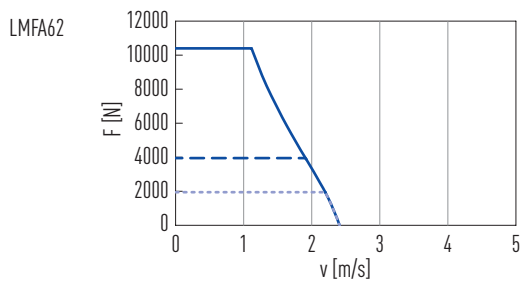


## Mounting tolerances



### 5.4.7 LMFA6 linear motor specifications

Force-velocity curves (DC bus voltage: 750 VDC)



# Linear Motors & Distance Measuring Systems

HIWIN LMFA linear motors

Table 5.7 Technical data for LMFA6

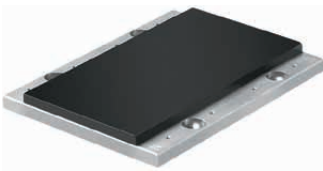
	Symbol	Unit	LMFA62	LMFA62L	LMFA63	LMFA63L	LMFA64	LMFA64L
<b>Forces and electrical parameters</b>								
Continuous force at $T_{max}$	$F_c$	N	1,979		2,969		3,958	
Continuous force at $T_{max}$ (WC)	$F_{c\_WC}$	N	3,958		5,938		7,917	
Continuous current at $T_{max}$	$I_c$	$A_{eff}$	5.8	11.5	8.7	17.3	11.5	23.1
Continuous current at $T_{max}$ (WC)	$I_{c\_WC}$	$A_{eff}$	11.5	23.1	17.3	34.6	23.1	46.2
Peak force (for 1 s)	$F_p$	N	10,413		15,620		20,827	
Peak current (for 1 s)	$I_p$	$A_{eff}$	35.8	71.6	53.7	107.4	71.3	142.6
Force constant	$K_f$	$N/A_{eff}$	342.7	171.4	342.7	171.4	342.7	171.4
Attraction force	$F_a$	N	20,580		30,870		41,160	
Electrical time constant	$K_e$	ms	12.0					
Resistance <sup>1)</sup>	$R_{25}$	$\Omega$	6.0	1.5	4.0	1.0	3.0	0.8
Inductance <sup>1)</sup>	L	mH	72.0	18.0	48.0	12.0	36.0	9.0
Back EMF constant	$K_u$	$V_{eff}/(m/s)$	197.9	98.9	197.9	98.9	197.9	98.9
Motor constant	$K_m$	$N/\sqrt{W}$	114.2		139.9		161.6	
Thermal resistance	$R_{th}$	$^{\circ}C/W$	0.24		0.16		0.12	
Thermal resistance (WC)	$R_{th\_WC}$	$^{\circ}C/W$	0.06		0.04		0.03	
Thermal switch			1 × PT1000 + 1 × (3 PTC SNM 120 in series)					
Max. DC bus voltage		V	750					
<b>Mechanical parameters</b>								
Pole pair pitch	$2\tau$	mm	46					
Max. winding temperature	$T_{max}$	$^{\circ}C$	120					
Mounting holes (forcer)	n		4		6		8	
Weight of forcer	$M_F$	kg	32.2		44.2		56.2	
Length of forcer	$L_F$	mm	375		536		697	
Unit mass of stator	$M_S$	kg/m	40.1					
Stator length/mounting holes	$L_S$	mm	184 mm/N = 2					

WC: with water cooling

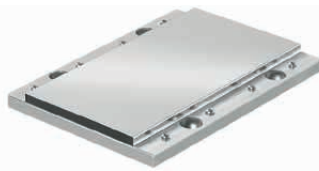
All specifications are in  $\pm 10\%$  of tolerance at 25  $^{\circ}C$  ambient temperature

<sup>1)</sup> Line to line

## Stator versions available



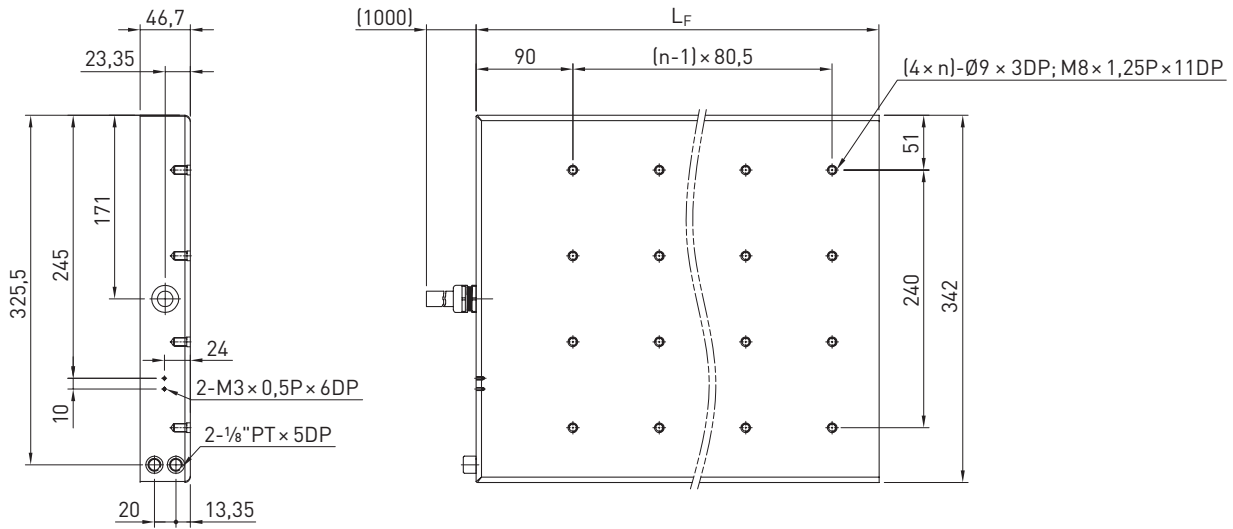
Epoxy: Full epoxy encapsulation of permanent magnets



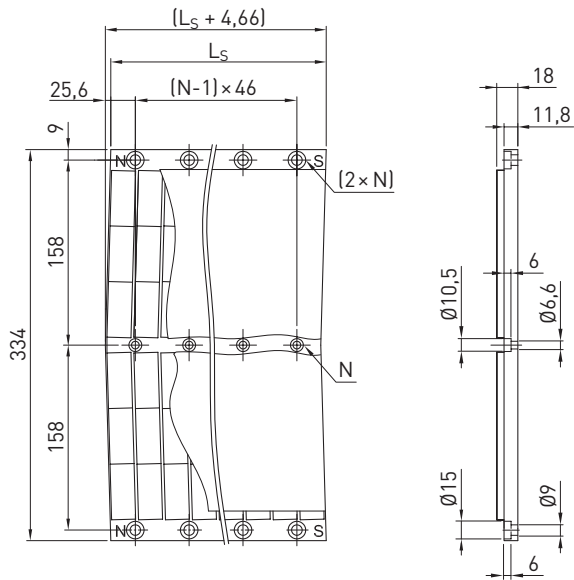
Stainless steel cover plate (upon request):  
Additional stainless steel cover plate for magnet tracks



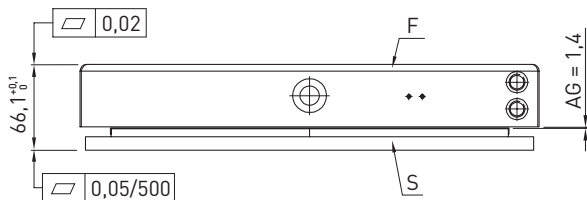
**Dimensions of forcer**



**Dimensions of stator**



**Mounting tolerances**



F Forcer  
S Stator  
AG Air gap

# Linear Motors & Distance Measuring Systems

HIWIN LMFP linear motors

## 6. HIWIN LMFP linear motors

### 6.1 Special characteristics of the LMFP linear motors

Like their cousins from the LMFA series, the enclosed HIWIN LMFP synchronous linear motors represent the cooled power packs among the linear drives. The decisive difference here is the fully encapsulated design in accordance with protection class IP65, thanks to which LMFP linear motors can also withstand difficult ambient conditions where others reach their limits. They achieve very high continuous forces, extremely high thrust forces and accelerations and, thanks to liquid cooling, do not introduce any additional process heat into your system.

LMFP linear motors are therefore the first choice for applications where very high loads encounter difficult ambient conditions with liquids or dust.



#### Key features of the LMFP linear motors:

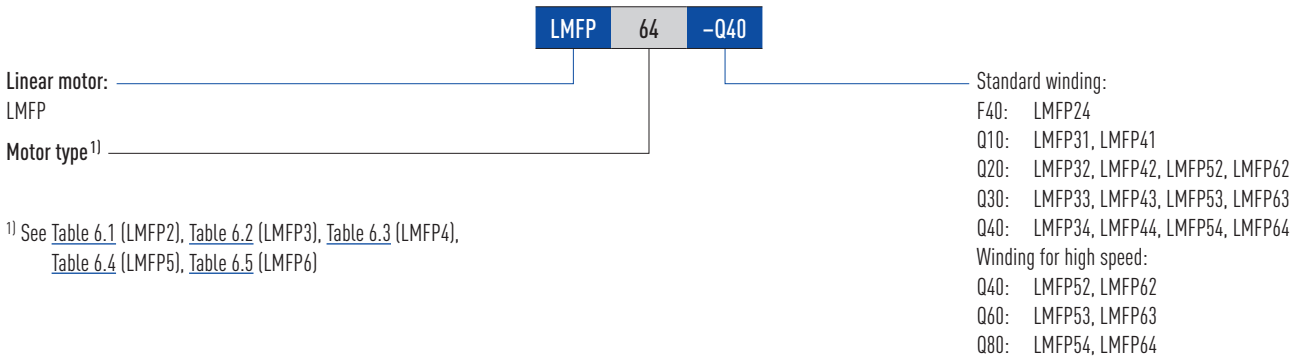
- Sealed design: Protection class IP65
- Efficient cooling system
- Extremely high thrust
- High acceleration
- High synchronous run
- Full epoxy encapsulation of permanent magnets in the stator
- Optional: version with Hall sensor

#### Typical fields of application of the LMFP linear motors:

- Machine tools
- Portal milling machines
- Sheet metal forming machines

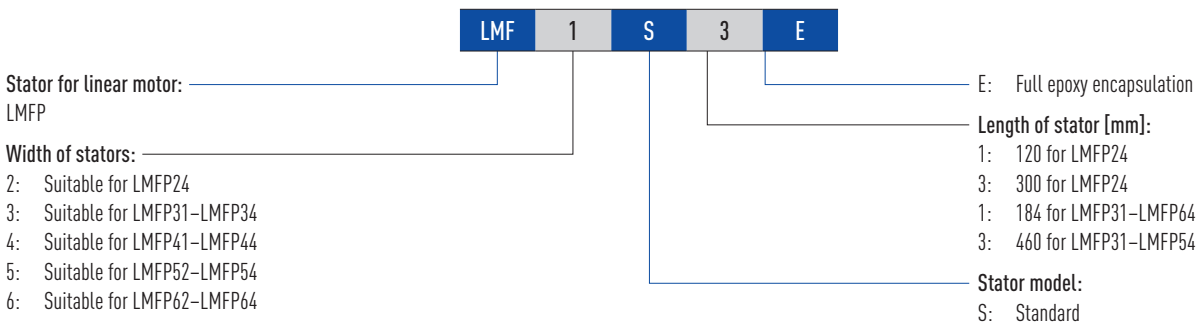
### 6.2 Order code LMFP linear motors

#### 6.2.1 Order code of primary part (forcer)

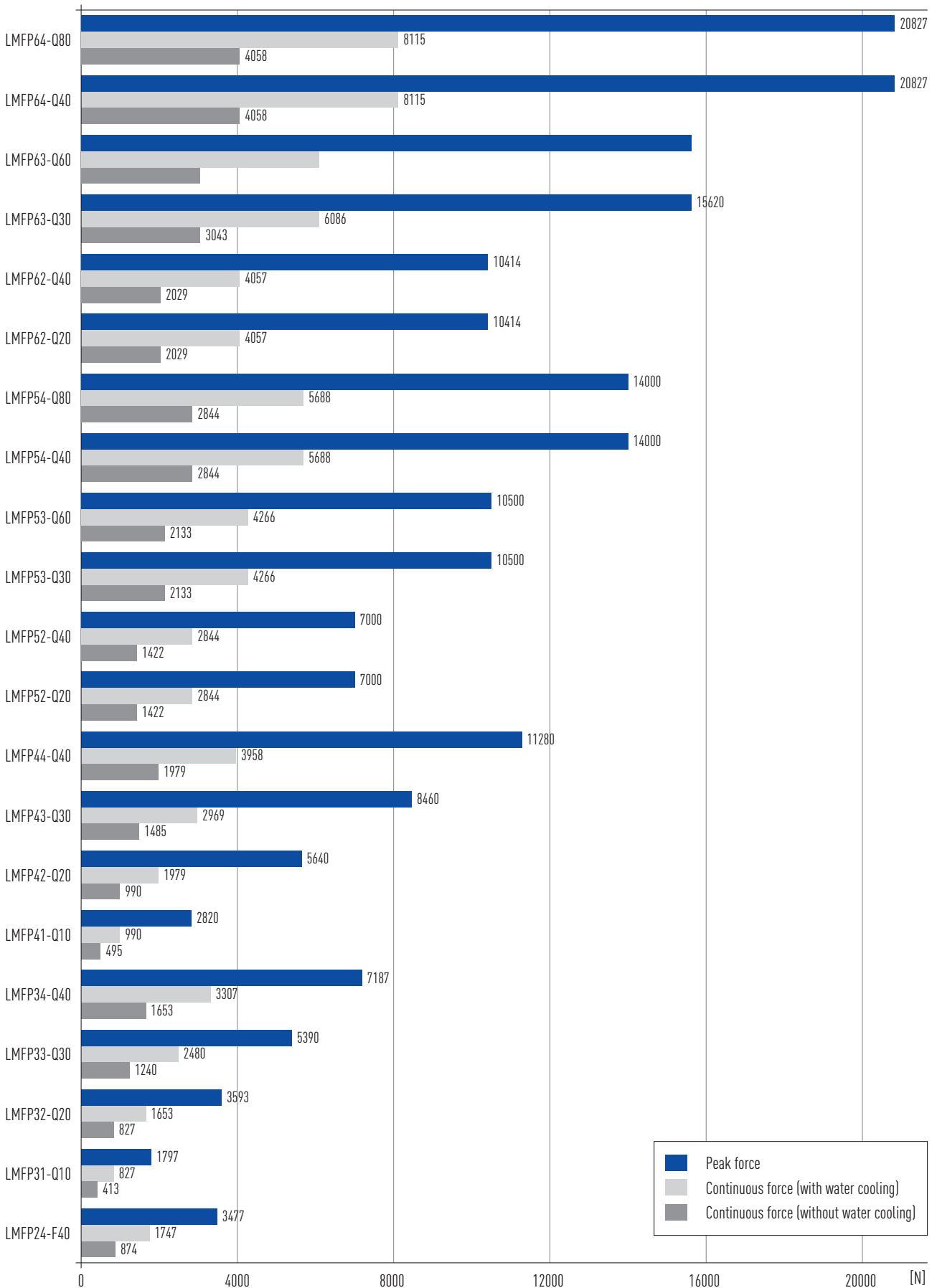


<sup>1)</sup> See [Table 6.1 \(LMFP2\)](#), [Table 6.2 \(LMFP3\)](#), [Table 6.3 \(LMFP4\)](#), [Table 6.4 \(LMFP5\)](#), [Table 6.5 \(LMFP6\)](#)

#### 6.2.2 Order code of magnet track (stator)



**6.3 Force chart for LMFP linear motors**



# Linear Motors & Distance Measuring Systems

HIWIN LMFP linear motors

## 6.4 LMFP linear motor specifications

### 6.4.1 LMFP2 linear motor specifications

Force-velocity curves (DC bus voltage: 600 VDC)

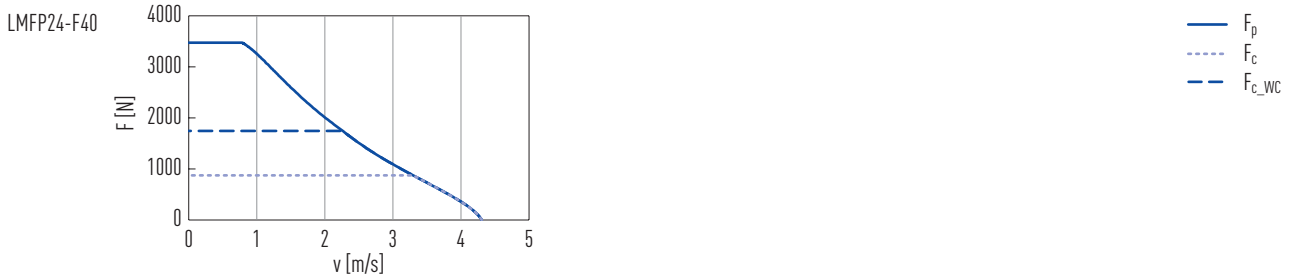


Table 6.1 Technical data for LMFP2

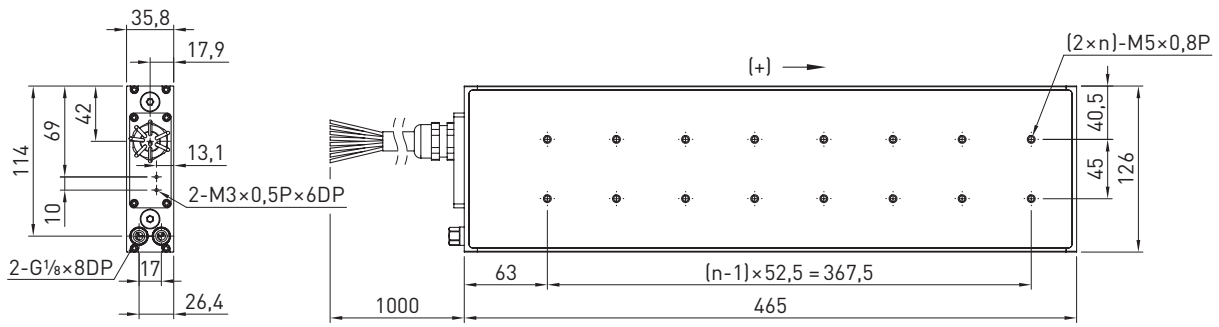
	Symbol	Unit	LMFP24-F40
<b>Forces and electrical parameters</b>			
Continuous force at $T_{max}$	$F_c$	N	874
Peak force at $T_{max}$ (WC)	$F_{c\_WC}$	N	1,747
Continuous current at $T_{max}$	$I_c$	$A_{eff}$	5.7
Continuous current at $T_{max}$ (WC)	$I_{c\_WC}$	$A_{eff}$	11.4
Peak force (for 1 s)	$F_p$	N	3,477
Peak current (for 1 s)	$I_p$	$A_{eff}$	32.8
Force constant	$K_f$	$N/A_{eff}$	153.6
Attraction force	$F_a$	N	4,583
Electrical time constant	$K_e$	ms	8.1
Resistance <sup>1)</sup>	$R_{25}$	$\Omega$	7.1
Inductance <sup>1)</sup>	L	mH	57.6
Back EMF constant	$K_v$	$V_{eff}/(m/s)$	88.7
Motor constant	$K_m$	$N/\sqrt{W}$	47
Thermal resistance	$R_{th}$	$^{\circ}C/W$	0.2
Thermal resistance (WC)	$R_{th\_WC}$	$^{\circ}C/W$	0.05
Thermal switch			1 × PT1000 + 1 × (3 PTC SNM 120 in series)
Max. DC bus voltage		V	750
<b>Mechanical parameters</b>			
Pole pair pitch	$2\tau$	mm	30
Max. winding temperature	$T_{max}$	$^{\circ}C$	120
Mounting holes (forcer)	n		16
Weight of forcer	$M_F$	kg	11
Length of forcer	$L_F$	mm	465
Unit mass of stator	$M_S$	kg/m	9.8
Stator length/mounting holes	$L_S$	mm	120 mm/N = 2; 300 mm/N = 5
Total height	H	mm	50.5

WC: with water cooling

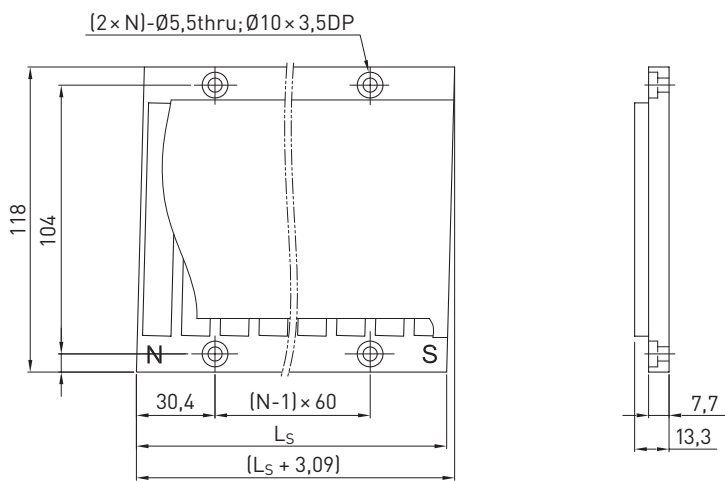
All specifications are in  $\pm 10\%$  of tolerance at 25  $^{\circ}C$  ambient temperature

<sup>1)</sup> Line to line

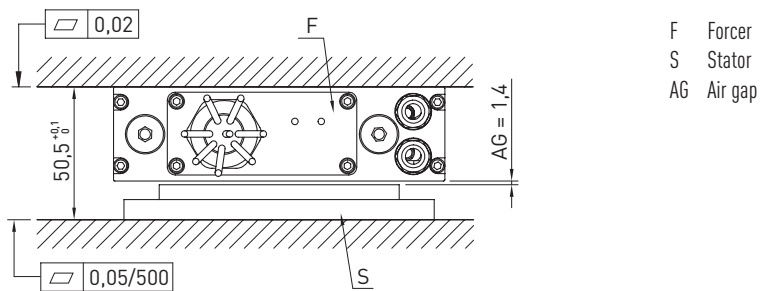
**Dimensions offorcer**



**Dimensions of stator**



**Mounting tolerances**



# Linear Motors & Distance Measuring Systems

HIWIN LMFP linear motors

## 6.4.2 LMFP3 linear motor specifications

Force-velocity curves (DC bus voltage: 600 VDC)

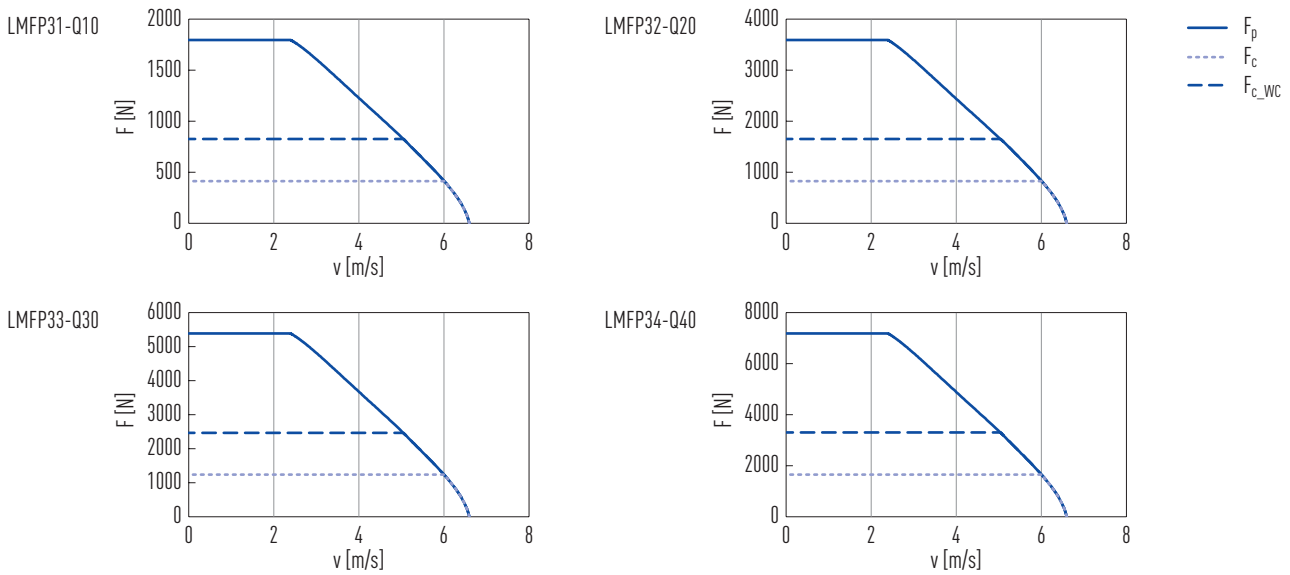


Table 6.2 Technical data for LMFP3

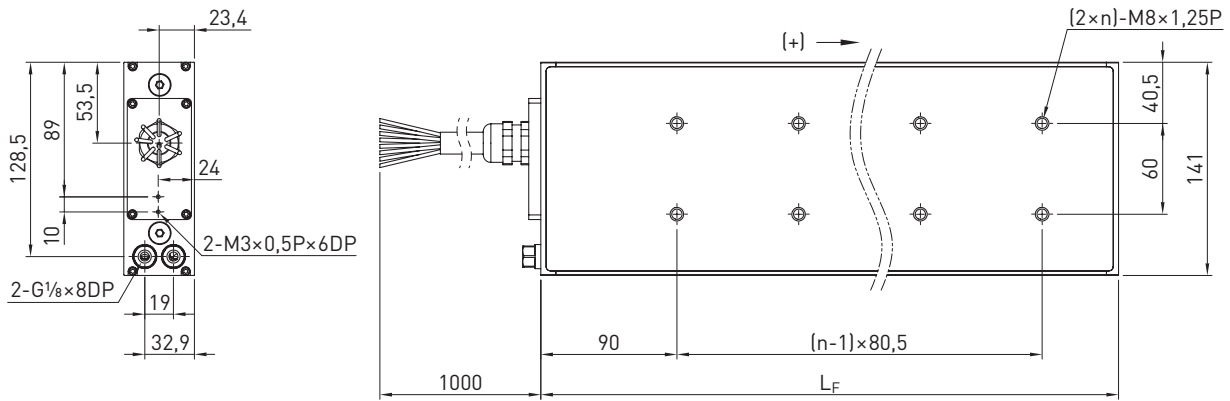
	Symbol	Unit	LMFP31-Q10	LMFP32-Q20	LMFP33-Q30	LMFP34-Q40
<b>Forces and electrical parameters</b>						
Continuous force at $T_{max}$	$F_c$	N	413	827	1,240	1,653
Peak force at $T_{max}$ (WC)	$F_{c\_WC}$	N	827	1,653	2,480	3,307
Continuous current at $T_{max}$	$I_c$	$A_{eff}$	4.1	8.2	12.4	16.5
Continuous current at $T_{max}$ (WC)	$I_{c\_WC}$	$A_{eff}$	8.2	16.5	24.7	33.0
Peak force (for 1 s)	$F_p$	N	1,797	3,593	5,390	7,187
Peak current (for 1 s)	$I_p$	$A_{eff}$	25.6	51.2	76.8	102.4
Force constant	$K_f$	$N/A_{eff}$	100.3	100.3	100.3	100.3
Attraction force	$F_a$	N	3,121	6,243	9,364	12,485
Electrical time constant	$K_e$	ms	12	12	12	12
Resistance <sup>1)</sup>	$R_{25}$	$\Omega$	3.6	1.8	1.2	0.9
Inductance <sup>1)</sup>	L	mH	43.2	21.6	14.4	10.8
Back EMF constant	$K_u$	$V_{eff}/(m/s)$	57.9	57.9	57.9	57.9
Motor constant	$K_m$	$N/\sqrt{W}$	43.3	61.4	74.5	86.2
Thermal resistance	$R_{th}$	$^{\circ}C/W$	0.77	0.38	0.26	0.19
Thermal resistance (WC)	$R_{th\_WC}$	$^{\circ}C/W$	0.19	0.09	0.06	0.05
Thermal switch			1 $\times$ PT1000 + 1 $\times$ (3 PTC SNM 120 in series)			
Max. DC bus voltage		V	750			
<b>Mechanical parameters</b>						
Pole pair pitch	$2\tau$	mm	46			
Max. winding temperature	$T_{max}$	$^{\circ}C$	120			
Mounting holes (forcer)	n		2	4	6	8
Weight of forcer	$M_F$	kg	6.9	12.1	17.8	23.1
Length of forcer	$L_F$	mm	221	382	543	704
Unit mass of stator	$M_S$	kg/m	16.2			
Stator length/mounting holes	$L_S$	mm	184 mm/N = 2; 460 mm/N = 5			
Total height	H	mm	64.1			

WC: with water cooling

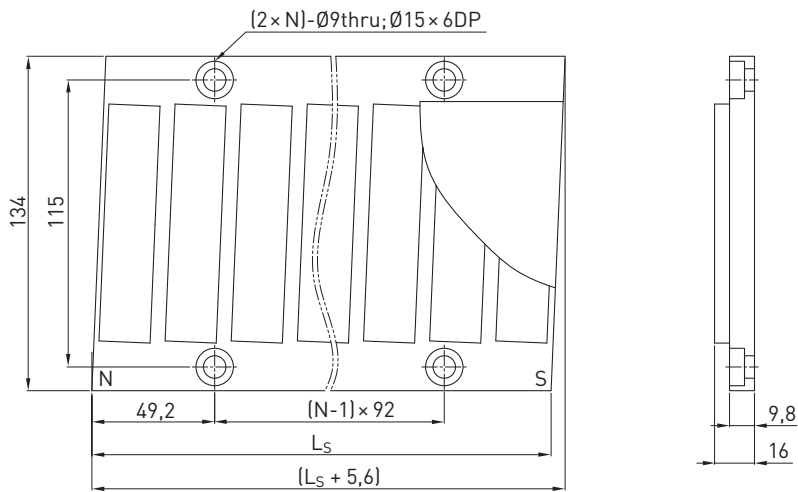
All specifications are in  $\pm 10\%$  of tolerance at 25  $^{\circ}C$  ambient temperature

<sup>1)</sup> Line to line

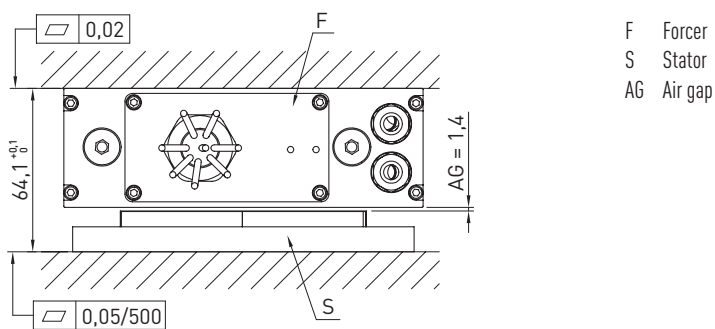
**Dimensions of forcer**



**Dimensions of stator**



**Mounting tolerances**



# Linear Motors & Distance Measuring Systems

HIWIN LMFP linear motors

## 6.4.3 LMFP4 linear motor specifications

Force-velocity curves (DC bus voltage: 600 VDC)

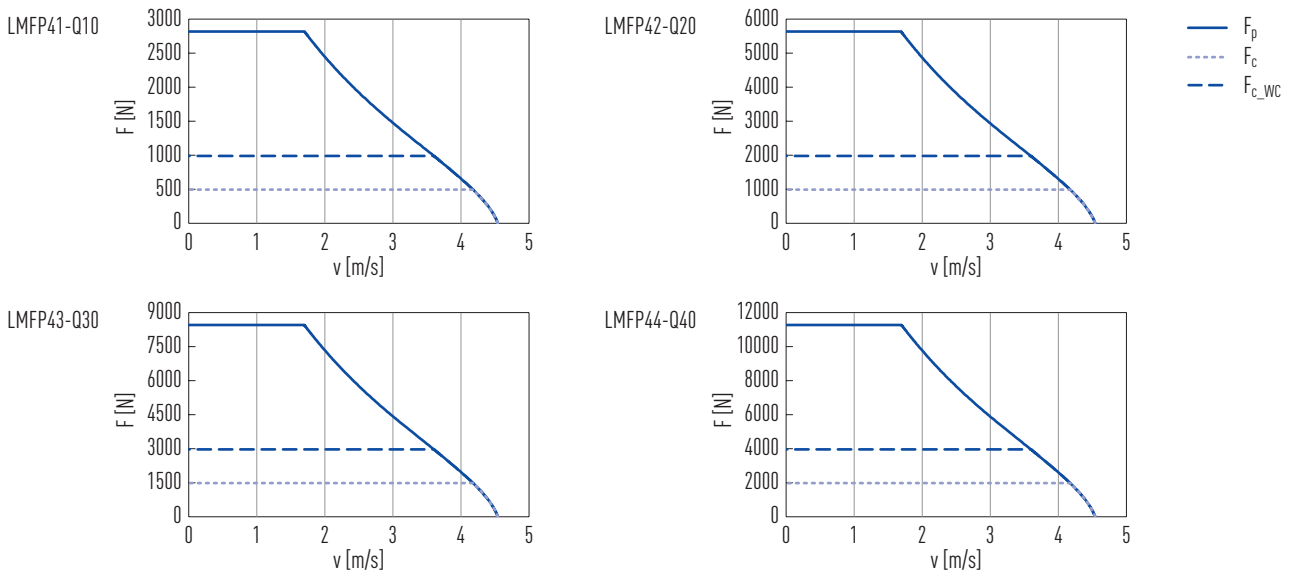


Table 6.3 Technical data for LMFP4

	Symbol	Unit	LMFP41-Q10	LMFP42-Q20	LMFP43-Q30	LMFP44-Q40
<b>Forces and electrical parameters</b>						
Continuous force at $T_{max}$	$F_c$	N	495	990	1,485	1,979
Peak force at $T_{max}$ (WC)	$F_{c\_WC}$	N	990	1,979	2,969	3,958
Continuous current at $T_{max}$	$I_c$	$A_{eff}$	3.4	6.8	10.2	13.6
Continuous current at $T_{max}$ (WC)	$I_{c\_WC}$	$A_{eff}$	6.8	13.6	20.4	27.2
Peak force (for 1 s)	$F_p$	N	2,820	5,640	8,460	11,280
Peak current (for 1 s)	$I_p$	$A_{eff}$	22.7	45.5	68.2	90.9
Force constant	$K_f$	$N/A_{eff}$	145.7	145.7	145.7	145.7
Attraction force	$F_a$	N	4,682	9,363	14,045	18,727
Electrical time constant	$K_e$	ms	12.6	12.4	12.6	12.4
Resistance <sup>1)</sup>	$R_{25}$	$\Omega$	5.1	2.6	1.7	1.3
Inductance <sup>1)</sup>	L	mH	64.5	32.3	21.5	16.1
Back EMF constant	$K_u$	$V_{eff}/(m/s)$	84.1	84.1	84.1	84.1
Motor constant	$K_m$	$N/\sqrt{W}$	52.6	73.7	91.2	104.2
Thermal resistance	$R_{th}$	$^{\circ}C/W$	0.78	0.38	0.26	0.19
Thermal resistance (WC)	$R_{th\_WC}$	$^{\circ}C/W$	0.20	0.10	0.07	0.05
Thermal switch			1 × PT1000 + 1 × (3 PTC SNM 120 in series)			
Max. DC bus voltage		V	750			
<b>Mechanical parameters</b>						
Pole pair pitch	$2\tau$	mm	46			
Max. winding temperature	$T_{max}$	$^{\circ}C$	120			
Mounting holes (forcer)	n		2	4	6	8
Weight of forcer	$M_F$	kg	9.9	16.7	25.0	29.8
Length of forcer	$L_F$	mm	221	382	543	704
Unit mass of stator	$M_S$	kg/m	22.3			
Stator length/mounting holes	$L_S$	mm	184 mm/N = 2; 460 mm/N = 5			
Total height	H	mm	66.1			

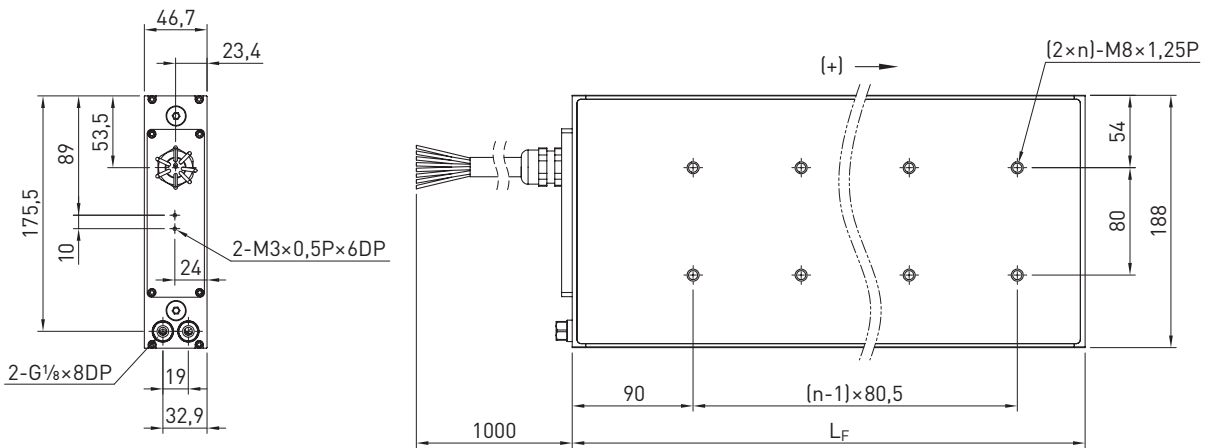
WC: with water cooling

All specifications are in  $\pm 10\%$  of tolerance at 25  $^{\circ}C$  ambient temperature

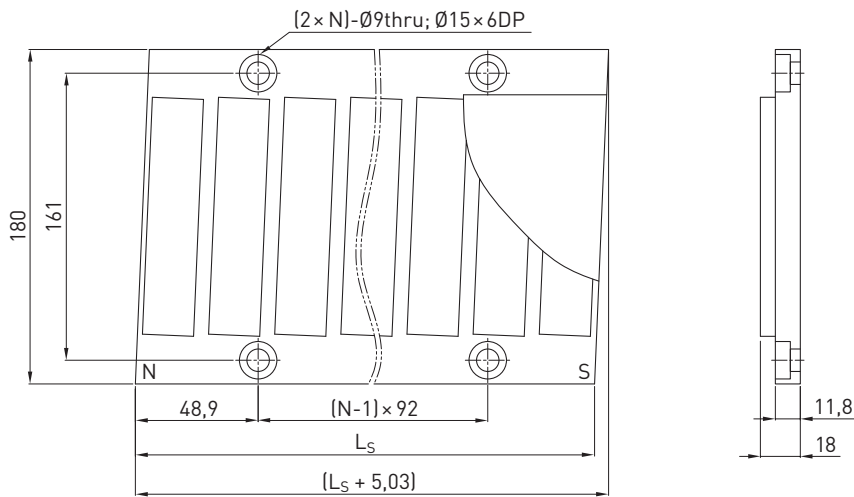
<sup>1)</sup> Line to line



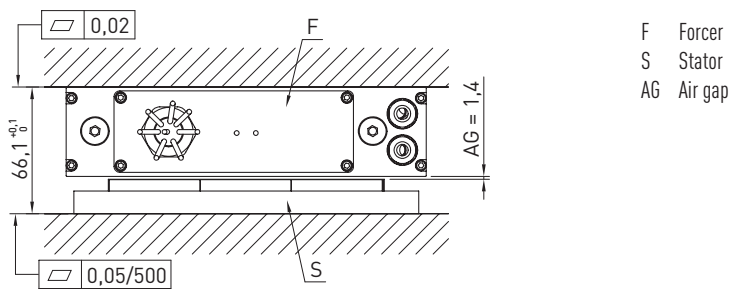
**Dimensions of forcer**



**Dimensions of stator**



**Mounting tolerances**



# Linear Motors & Distance Measuring Systems

HIWIN LMFP linear motors

## 6.4.4 LMFP5 linear motor specifications

Force-velocity curves (DC bus voltage: 600 VDC)

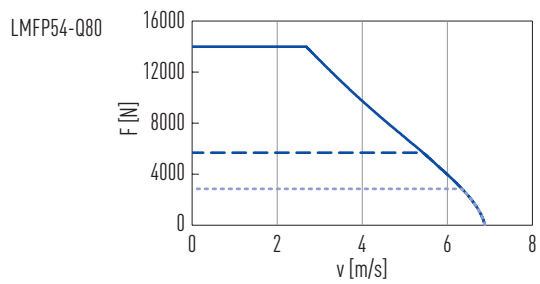
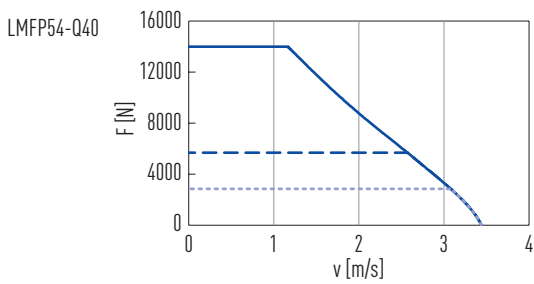
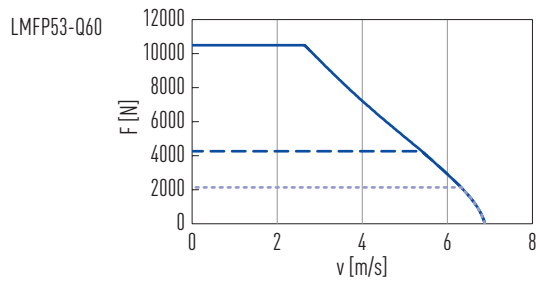
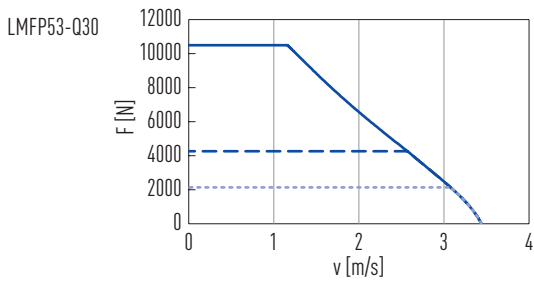
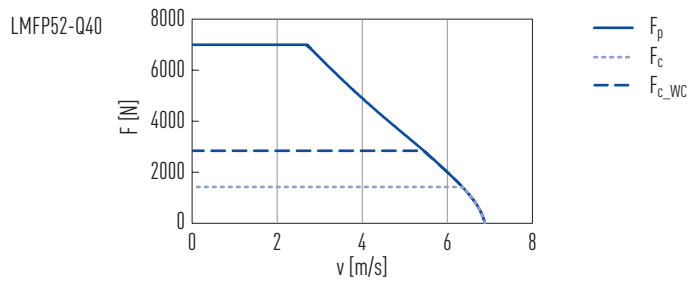
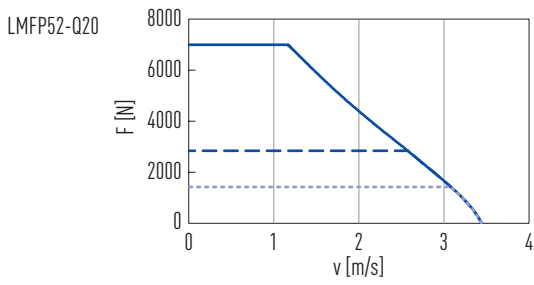


Table 6.4 Technical data for LMFP5

	Symbol	Unit	LMFP52-Q20	LMFP52-Q40	LMFP53-Q30	LMFP53-Q60	LMFP54-Q40	LMFP54-Q80
<b>Forces and electrical parameters</b>								
Continuous force at $T_{max}$	$F_c$	N	1,422	1,422	2,133	2,133	2,844	2,844
Peak force at $T_{max}$ (WC)	$F_{c\_WC}$	N	2,844	2,844	4,266	4,266	5,688	5,688
Continuous current at $T_{max}$	$I_c$	$A_{eff}$	7.4	14.8	11.1	22.2	14.8	29.6
Continuous current at $T_{max}$ (WC)	$I_{c\_WC}$	$A_{eff}$	14.8	29.6	22.2	44.4	29.6	59.2
Peak force (for 1 s)	$F_p$	N	7,000	7,000	10,500	10,500	14,000	14,000
Peak current (for 1 s)	$I_p$	$A_{eff}$	46.3	92.7	69.5	139.0	92.7	185.3
Force constant	$K_f$	$N/A_{eff}$	192.3	96.1	192.3	96.1	192.3	96.1
Attraction force	$F_a$	N	12,467	12,467	18,700	18,700	24,933	24,933
Electrical time constant	$K_e$	ms	12.6	13.4	12.4	12.0	12.6	13.5
Resistance <sup>1)</sup>	$R_{25}$	$\Omega$	3.4	0.8	2.3	0.6	1.7	0.4
Inductance <sup>1)</sup>	L	mH	42.9	10.7	28.6	7.2	21.5	5.4
Back EMF constant	$K_u$	$V_{eff}/(m/s)$	111.0	55.5	111.0	55.5	111.0	55.5
Motor constant	$K_m$	$N/\sqrt{W}$	85.1	87.7	103.5	101.3	120.3	124
Thermal resistance	$R_{th}$	$^{\circ}C/W$	0.25	0.26	0.16	0.16	0.13	0.14
Thermal resistance (WC)	$R_{th\_WC}$	$^{\circ}C/W$	0.06	0.07	0.04	0.04	0.03	0.04
Thermal switch			1 × PT1000 + 1 × (3 PTC SNM 120 in series)					
Max. DC bus voltage		V	750					
<b>Mechanical parameters</b>								
Pole pair pitch	$2\tau$	mm	46					
Max. winding temperature	$T_{max}$	$^{\circ}C$	120					
Mounting holes (forcer)	n		4	4	6	6	8	8
Weight of forcer	$M_f$	kg	24.8	24.8	33.5	33.5	42.3	42.3
Length of forcer	$L_f$	mm	382	382	543	543	704	704
Unit mass of stator	$M_s$	kg/m	25					
Stator length/mounting holes	$L_s$	mm	184 mm/N = 2; 276 mm/N = 3; 460 mm/N = 5					
Total height	H	mm	64.1					

WC: with water cooling

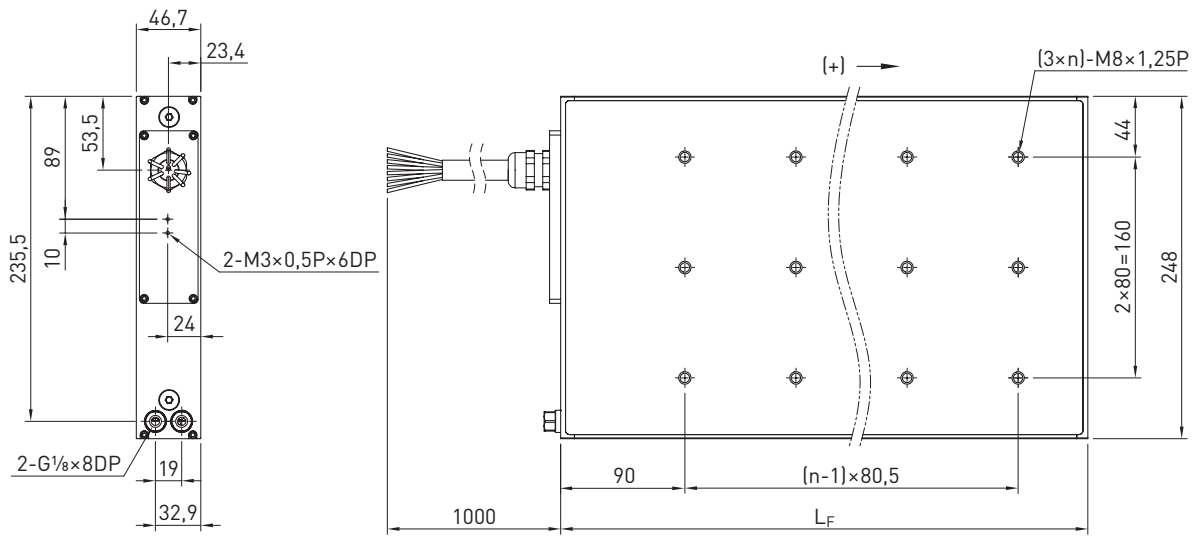
All specifications are in  $\pm 10\%$  of tolerance at 25  $^{\circ}C$  ambient temperature

<sup>1)</sup> Line to line

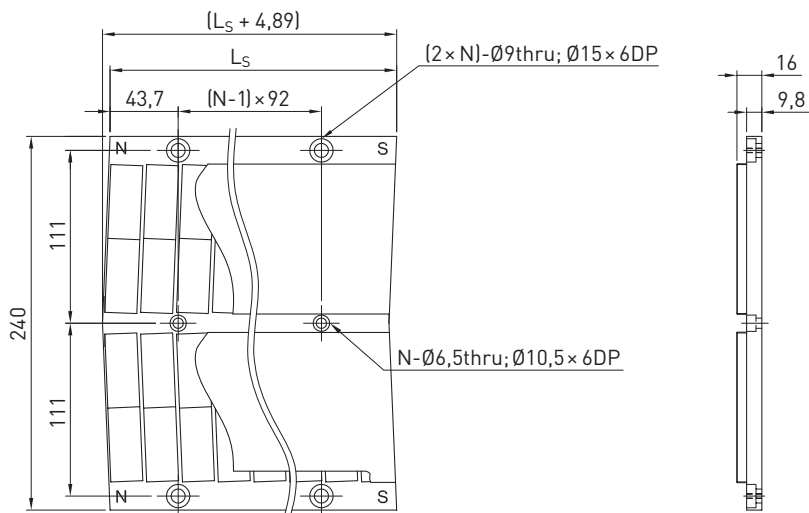
# Linear Motors & Distance Measuring Systems

HIWIN LMFP linear motors

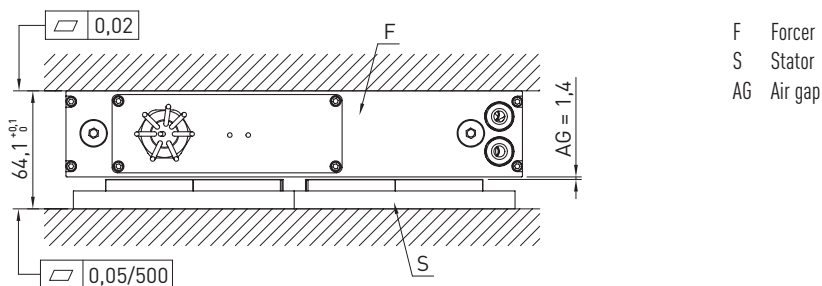
## Dimensions of forcer



## Dimensions of stator

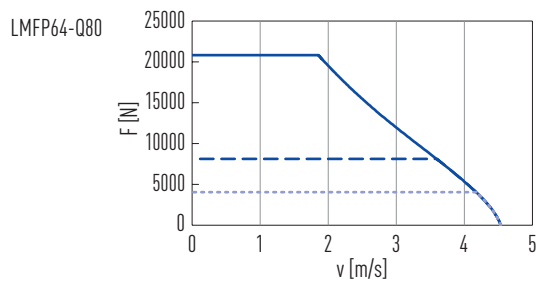
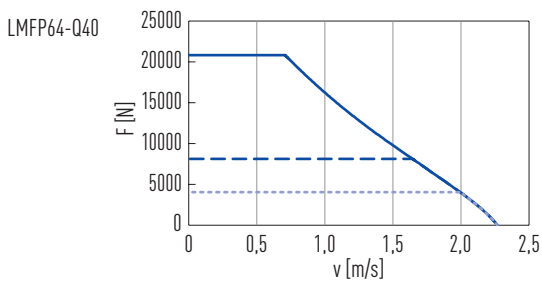
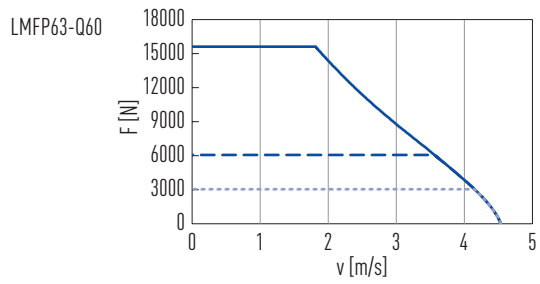
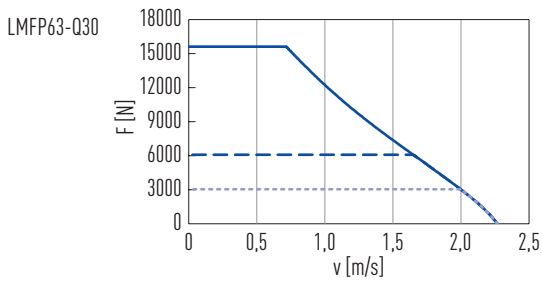
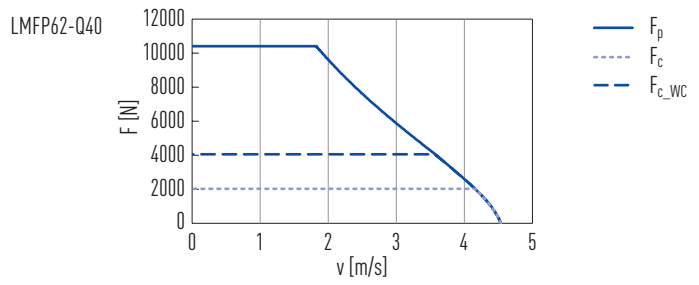
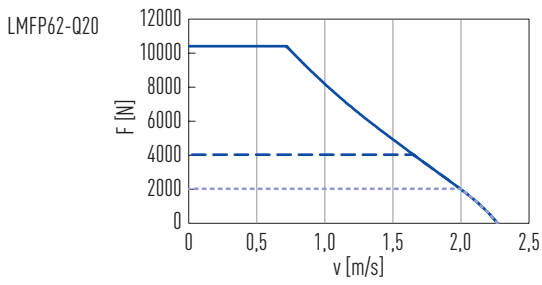


## Mounting tolerances



### 6.4.5 LMFP6 linear motor specifications

Force-velocity curves (DC bus voltage: 600 VDC)



# Linear Motors & Distance Measuring Systems

HIWIN LMFP linear motors

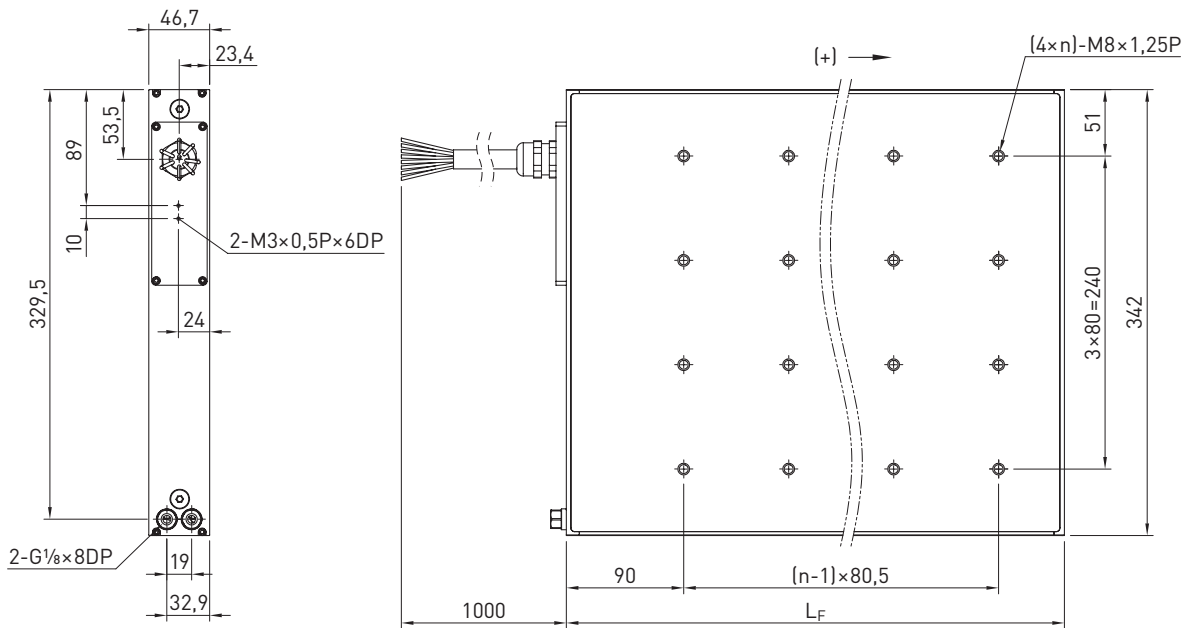
Table 6.5 Technical data for LMFP6								
	Symbol	Unit	LMFP62-Q20	LMFP62-Q40	LMFP63-Q30	LMFP63-Q60	LMFP64-Q40	LMFP64-Q80
<b>Forces and electrical parameters</b>								
Continuous force at $T_{max}$	$F_c$	N	2,029	2,029	3,043	3,043	4,058	4,058
Peak force at $T_{max}$ (WC)	$F_{c\_WC}$	N	4,057	4,057	6,086	6,086	8,115	8,115
Continuous current at $T_{max}$	$I_c$	$A_{eff}$	7.0	13.9	10.4	20.9	13.9	27.8
Continuous current at $T_{max}$ (WC)	$I_{c\_WC}$	$A_{eff}$	13.9	27.8	20.9	41.7	27.8	55.7
Peak force (for 1 s)	$F_p$	N	10,414	10,414	15,620	15,620	20,827	20,827
Peak current (for 1 s)	$I_p$	$A_{eff}$	41.9	83.8	62.9	125.7	83.8	167.6
Force constant	$K_f$	$N/A_{eff}$	291.7	145.8	291.7	145.8	291.7	145.8
Attraction force	$F_a$	N	18,727	18,727	28,091	28,091	37,454	37,454
Electrical time constant	$K_e$	ms	12.6	12.4	12.6	11.9	12.4	13.3
Resistance <sup>1)</sup>	$R_{25}$	$\Omega$	5.1	1.3	3.4	0.9	2.6	0.6
Inductance <sup>1)</sup>	L	mH	64.3	16.1	42.9	10.7	32.2	8.0
Back EMF constant	$K_u$	$V_{eff}/(m/s)$	168.4	84.2	168.4	84.2	168.4	84.2
Motor constant	$K_m$	$N/\sqrt{W}$	104.8	104.5	129.6	125.3	147.8	153.9
Thermal resistance	$R_{th}$	$^{\circ}C/W$	0.18	0.18	0.12	0.12	0.09	0.10
Thermal resistance (WC)	$R_{th\_WC}$	$^{\circ}C/W$	0.05	0.05	0.03	0.03	0.02	0.03
Thermal switch			1 × PT1000 + 1 × (3 PTC SNM 120 in series)					
Max. DC bus voltage		V	750					
<b>Mechanical parameters</b>								
Pole pair pitch	$2\tau$	mm	46					
Max. winding temperature	$T_{max}$	$^{\circ}C$	120					
Mounting holes (forcer)	n		16	16	24	24	32	32
Weight of forcer	$M_F$	kg	33.4	33.4	46.7	46.7	57.6	57.6
Length of forcer	$L_F$	mm	382	382	543	543	704	704
Unit mass of stator	$M_S$	kg/m	40.1					
Stator length/mounting holes	$L_S$	mm	184 mm/N = 4					
Total height	H	mm	66.1					

WC: with water cooling

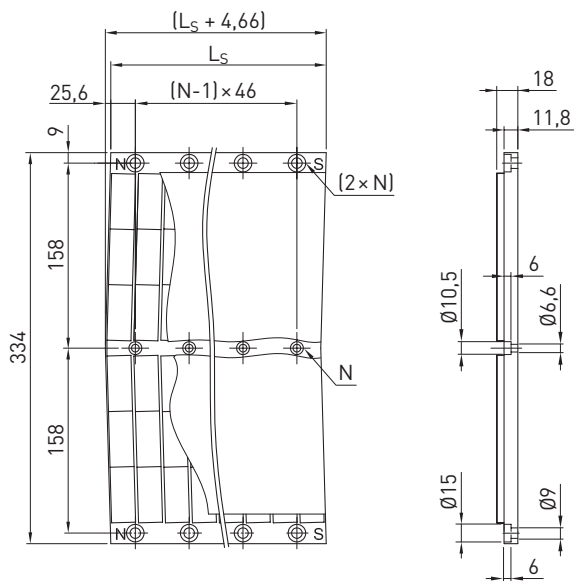
All specifications are in  $\pm 10\%$  of tolerance at 25  $^{\circ}C$  ambient temperature

<sup>1)</sup> Line to line

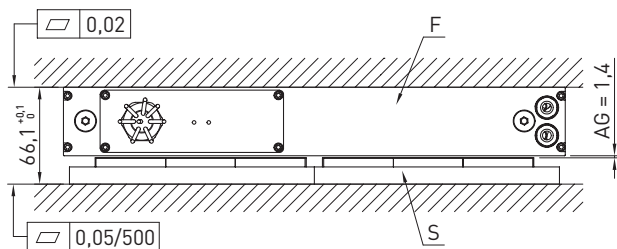
**Dimensions of forcer**



**Dimensions of stator**



**Mounting tolerances**



- F Forcer
- S Stator
- AG Air gap

# Linear Motors & Distance Measuring Systems

## Accessories

### 7. Accessories

#### 7.1 Hall sensors

Hall sensors with analogue and digital output signal are available for each linear motor. The analogue Hall sensors have a sin/cos output signal of  $1V_{pp}$  (see Fig. 7.1) The digital Hall sensors have three square signals offset through  $120^\circ$  (see Fig. 7.2).

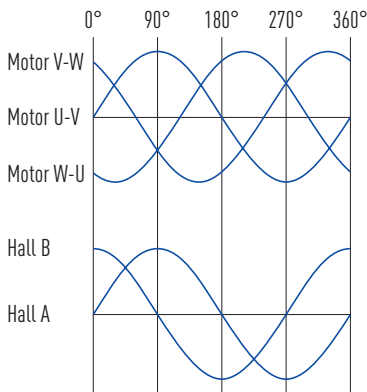


Fig. 7.1 Output signal from analogue Hall sensor with differential output

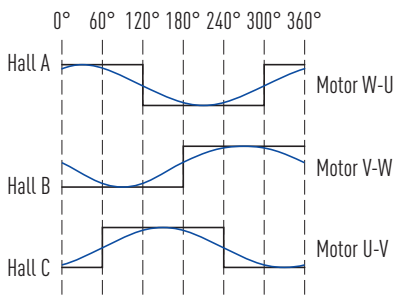


Fig. 7.2 Output signal from digital Hall sensor with single ended output

Article number	Version	Motor
8-08-0330	Digital	LMSA
8-08-0387	Digital	LMS
8-08-0386	Digital	LMCA, LMCB, LMCC
8-08-0422	Digital	LMCE
8-08-0454	Digital	LMFA0, LMFA2, LMFA2
8-08-0519	Digital	LMFA3, LMFA4, LMFA5, LMFA6
8-08-0369	Analogue	LMSA
8-08-0388	Analogue	LMS
8-08-0432	Analogue	LMCA, LMCB, LMCC
8-08-0456	Analogue	LMFA0, LMFA2, LMFA2
8-08-0368	Analogue	LMFA3, LMFA4, LMFA5, LMFA6



## 7.2 Motor extension cables

### 7.2.1 Extension cables for linear motors LMSA, LMS, LMFA

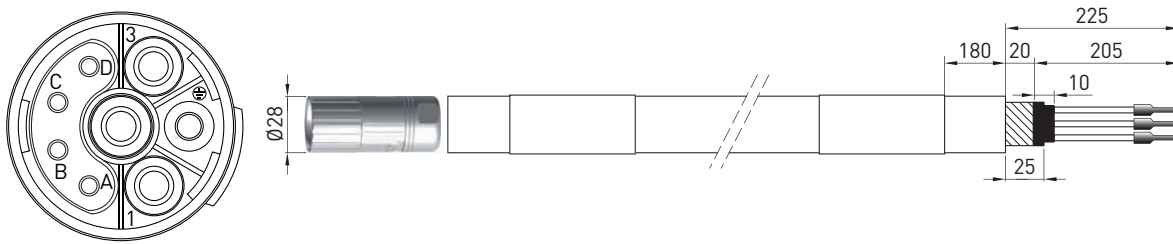


Table 7.2 Extension cables for motors LMS, LMSA, LMSC and LMFA (iron-core)

Article number	Designation	Cross-section	Plug	Length [m]
8-10-0069	Chainflex CF27.15.05.04.D	4 × 1.5 mm <sup>2</sup> ; 4 × 0.5 mm <sup>2</sup>	M23, 8-pin	3
8-10-0070				5
8-10-0071				8
8-10-0072				10
8-10-0074				15
8-10-0593	Chainflex CF27.25.05.04.D	4 × 2.5 mm <sup>2</sup> ; 4 × 0.5 mm <sup>2</sup>	M23, 8-pin	3
8-10-0594				5
8-10-0595				8
8-10-0596				10
8-10-0598				15
8-10-0946	Chainflex CF27.40.05.04.D	4 × 4.0 mm <sup>2</sup> ; 4 × 0.5 mm <sup>2</sup>	M23, 8-pin	3
8-10-0971				5
8-10-0972				8
8-10-0973				10
8-10-0947				15
8-10-0879	Chainflex CF27.40.05.04.D	4 × 4.0 mm <sup>2</sup> ; 4 × 0.5 mm <sup>2</sup>	M40, 8-pin	3
8-10-0880				5
8-10-0881				8
8-10-0882				10
8-10-0974				15

### 7.2.2 Extension cables for linear motors LMC

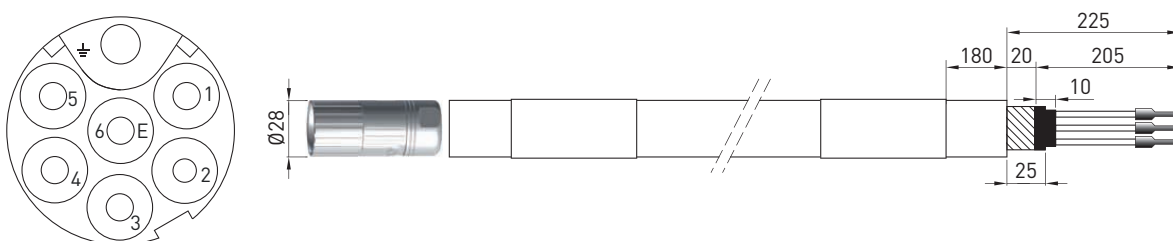


Table 7.3 Extension cables for motors LMS (ironless)

Article number	Designation	Cross-section	Length [m]
8-10-0258	Chainflex CF10.07.07	7 × 0.75 mm <sup>2</sup>	3
8-10-0259			5
8-10-0260			8
8-10-0261			10
8-10-0263			15

# Linear Motors & Distance Measuring Systems

## Accessories

### 7.3 Motor connectors

#### 7.3.1 Recommended motor connectors for iron-core linear motors

By default, the temperature sensor is continued via the motor extension cable, which is why the temperature sensor cable is attached to the motor connector. For continuous currents up to 30 A we recommend the M23 couplings and connectors, for continuous currents over 30 A the M40 couplings and connectors.

Table 7.4 Recommended motor connector for continuous currents up to 30 A for LMSA, LMS and LMFA motors


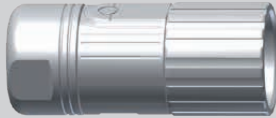
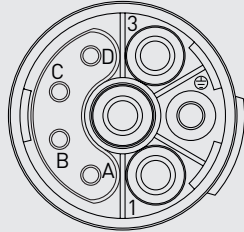
Coupling M23, 8-pin	Connector M23, 8-pin	Pin assignment
		
Article number: 8-10-0421	Article number: 8-10-0422	Coupling: connector-end view

Table 7.5 Recommended motor connector for continuous currents from 30 A for LMFA motors



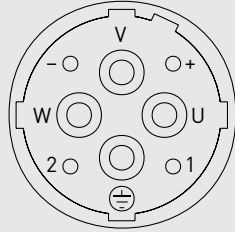
Coupling M40, 8-pin	Connector M40, 8-pin	Pin assignment
		
Article number: 8-10-0507	Article number: 8-10-0508	Coupling: connector-end view

Table 7.6 Pin assignment of motor connector M23/M40, 8-pin

Motor cable	Pin no.	Signal	Function	Extension cable
Black-1	1	U	Motor phase	Black-1
Black-2	4	V	Motor phase	Black-2
Black-3	3	W	Motor phase	Black-3
<b>LMFA</b>				
Red	A	T+ <sup>1)</sup>	Thermal protection	Red
Yellow	B	T- <sup>1)</sup>	Thermal protection	Yellow
Black	C	T+ <sup>2)</sup>	Thermal protection	Black
White	D	T- <sup>2)</sup>	Thermal protection	White
<b>LMSA</b>				
Yellow	A	T+ <sup>1)</sup>	Thermal protection	Red
Green	B	T- <sup>1)</sup>	Thermal protection	Yellow
Brown	C	T+ <sup>2)</sup>	Thermal protection	Black
White	D	T- <sup>2)</sup>	Thermal protection	White
<b>LMS</b>				
Brown	A	T+ <sup>1)</sup>	Thermal protection	Red
Blue	B	T- <sup>1)</sup>	Thermal protection	Yellow
—	C	—	—	Black
—	D	—	—	White
Green /yellow	Protective earth/ground		GND	Green /yellow

<sup>1)</sup> PTC temperature sensor

<sup>2)</sup> PT1000/KTY84 temperature sensor

### 7.3.2 Recommended motor connectors for ironless linear motors

By default, the temperature sensor is continued via the motor extension cable, which is why the temperature sensor cable is attached to the motor connector.

Table 7.7 Recommended motor connector for LMC motors


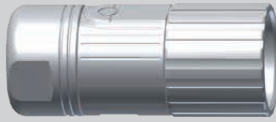
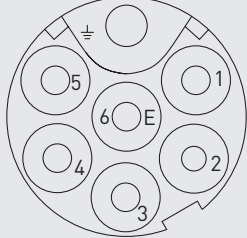
Coupling M17, 7-pin	Connector M17, 7-pin	Pin assignment
		
Article number: 8-10-0437	Article number: 8-10-0433	Coupling: connector-end view

Table 7.8 Pin assignment of motor connector M17, 7-pin

Motor cable	Pin no.	Signal	Function	Extension cable
Brown	1	U	Motor phase	Black-1
White	4	V	Motor phase	Black-2
Grey	3	W	Motor phase	Black-3
Yellow	5	T+ <sup>1)</sup>	Thermal protection	Black-5
Green	6	T- <sup>1)</sup>	Thermal protection	Black-6
—	2	—	Not assigned	—
Green/Yellow	Protective earth/ground	—	GND	Green/Yellow

<sup>1)</sup> PTC temperature sensor

# Linear Motors & Distance Measuring Systems

## HIWIN MAGIC – magnetic distance measuring systems

### 8. HIWIN MAGIC – magnetic distance measuring systems

The magnetic distance measuring systems of the HIWIN MAGIC series are optimised for measuring the distances travelled in linear movements and particularly on linear motor axes. They are particularly suitable for use in harsh environmental conditions and are resistant to oil, dirt, vibrations and shocks.

The robust housing is electrically shielded, and signals are output in real time.

Two types are available:

- HIWIN MAGIC: type with separate encoder
- HIWIN MAGIC-PG: distance measuring system integrated in a linear guideway

#### Characteristics of MAGIC and MAGIC-PG

- Zero contact measurement with 1 V<sub>PP</sub> or digital output
- Digital resolution of 1 μm
- Encoder and housing are resistant to dust, humidity, oil and chips
- Encoder with metal housing and IP67 protection class
- Simple assembly
- Signal output in real time
- Special housing for EMC optimization

#### 8.1 HIWIN distance measuring systems

This distance measuring system consists of a separate encoder (Fig. 8.1) and a magnetic scale (Fig. 8.2). The customer can select suitable positions for both of these and install them. The measuring system HIWIN MAGIC is optimised for use on linear motor axes.

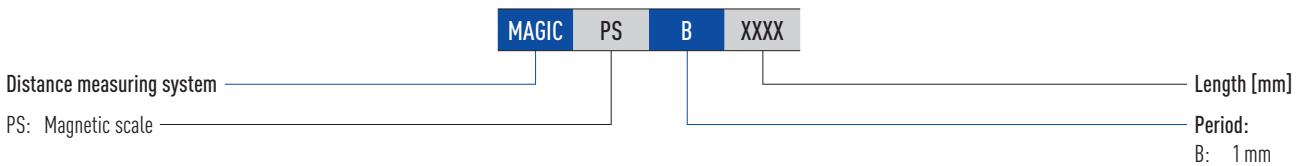


Fig. 8.1 MAGIC encoder

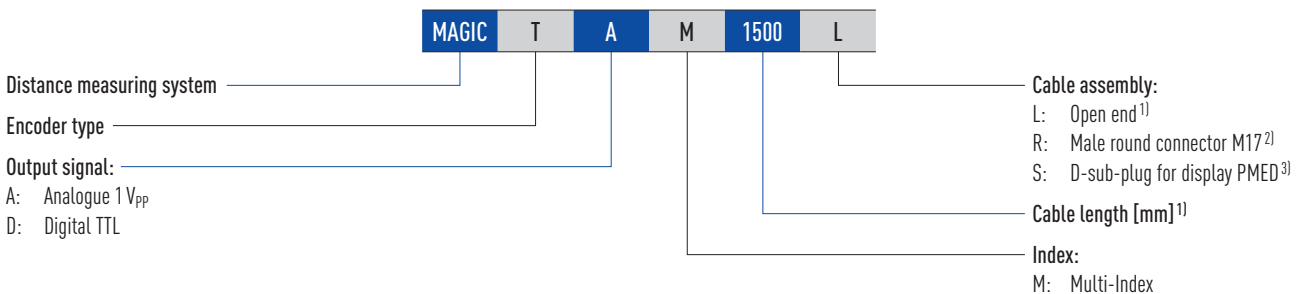


Fig. 8.2 MAGIC magnetic scale

#### 8.1.1 Order code for magnetic scale of HIWIN MAGIC distance measuring system



#### 8.1.2 Order code for encoder of HIWIN MAGIC distance measuring system



<sup>1)</sup> With open ends, the 1,000 cable length should be selected as standard (max. length: 5,000 mm)

<sup>2)</sup> Suitable for the pre-assembled HIWIN extension cable, see Section 8.4.1

<sup>3)</sup> The display has to be ordered separately

## 8.2 HIWIN MAGIC-PG distance measuring system

For this type, the distance measuring system is integrated in a linear guideway. The complete unit is referred to as a positioning guideway (PG). The encoder is fitted to a

standard block. It is suitable for HG\_20, HG\_25, QH\_20, QH\_25, CG\_20 and CG\_25. A magnetic scale is integrated directly in a profile rail (see Fig. 8.3 and Fig. 8.4).

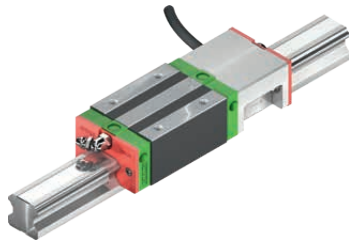


Fig. 8.3 MAGIC-PG system for HG and QH blocks

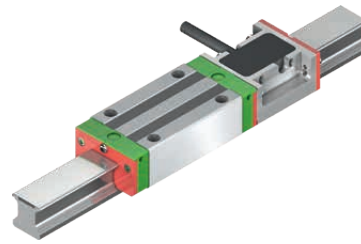
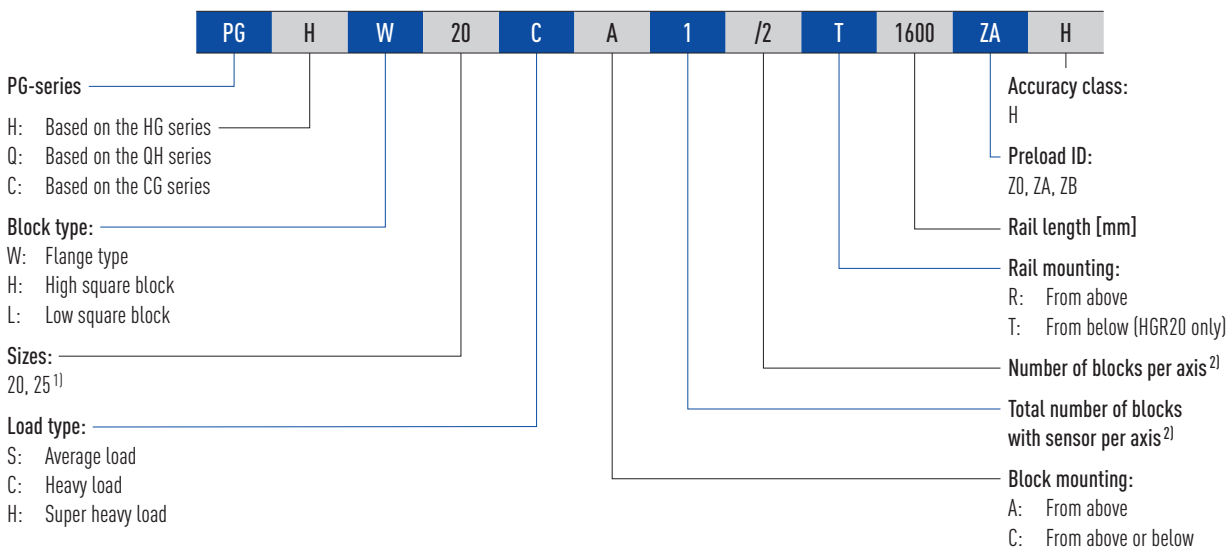
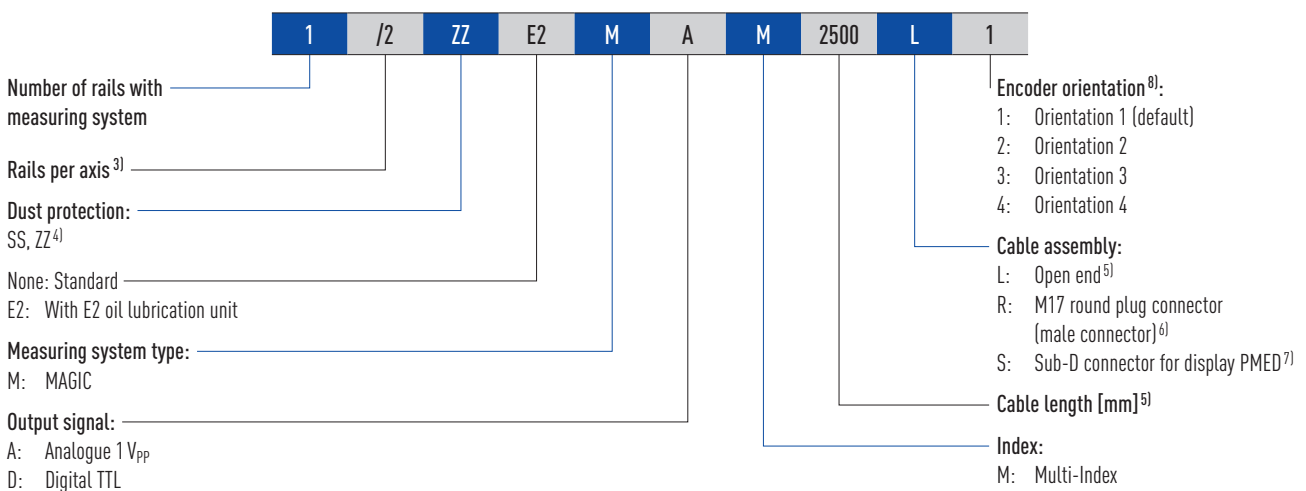


Fig. 8.4 MAGIC-PG system for CG blocks

### 8.2.1 Order code for HIWIN MAGIC-PG linear guideways



Continuation order code for HIWIN MAGIC-PG linear guideway:



<sup>1)</sup> PGH, PGQ: not identical to the standard rail HGR25R without groove. Mounting screw M5 instead of M6

<sup>2)</sup> In the PG series, the total number of blocks per axis is specified (all blocks of the ordered article)

<sup>3)</sup> The figure 2 is also a quantity, i.e. one item of the above-mentioned article consists of a pair of rails. No number is specified for individual rails

<sup>4)</sup> If nothing is specified, the block will be supplied with standard dust protection (standard end seal and bottom seal)

<sup>5)</sup> With open ends, the 1,000 cable length should be selected as standard (max. length PGH, PGQ: 5,000 mm; PGC: 1,000 mm)

<sup>6)</sup> Suitable for the pre-assembled HIWIN extension cable, see Section 8.4.1

<sup>7)</sup> The display has to be ordered separately

<sup>8)</sup> See Section 8.3.1

# Linear Motors & Distance Measuring Systems

HIWIN MAGIC – magnetic distance measuring systems

## 8.3 HIWIN MAGIC distance measuring systems: technical data

### 8.3.1 Orientation of the HIWIN MAGIC-PG encoder

According to the order code (Section 8.2.1) the HIWIN MAGIC-PG encoder is available the orientations 1 to 4. Without a statement about the required orientation the encoder is delivered by default (orientation 1).

For more than one block on a rail or on a rail pair, the encoder is assembled on block 1, rail 1, as shown in Fig. 8.5. If a non-standard orientation is needed, this has to be defined in the MAGIC-PG project planning sheet ([www.hiwin.de](http://www.hiwin.de)).

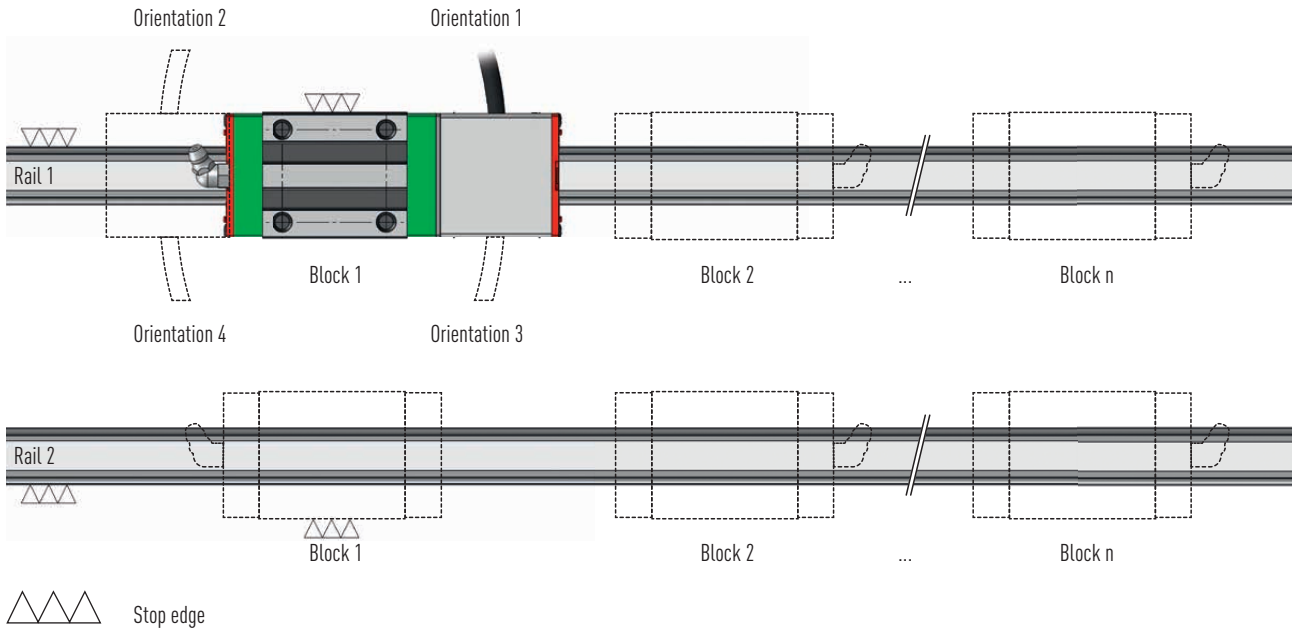


Fig. 8.5 Orientation of the HIWIN MAGIC-PG encoder

### 8.3.2 Dimensions

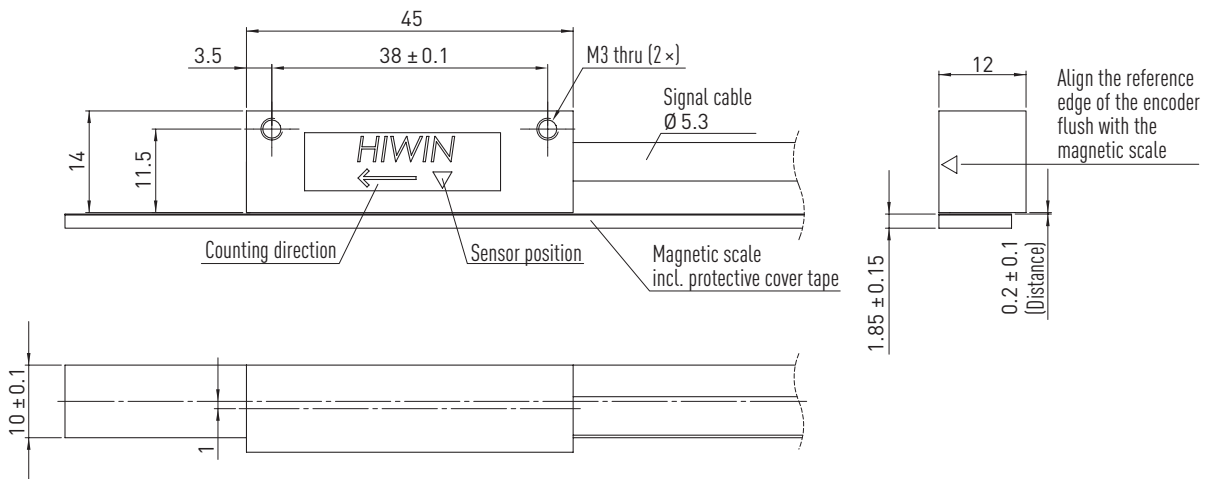


Fig. 8.6 Scale drawing of HIWIN MAGIC encoder

Unit: mm

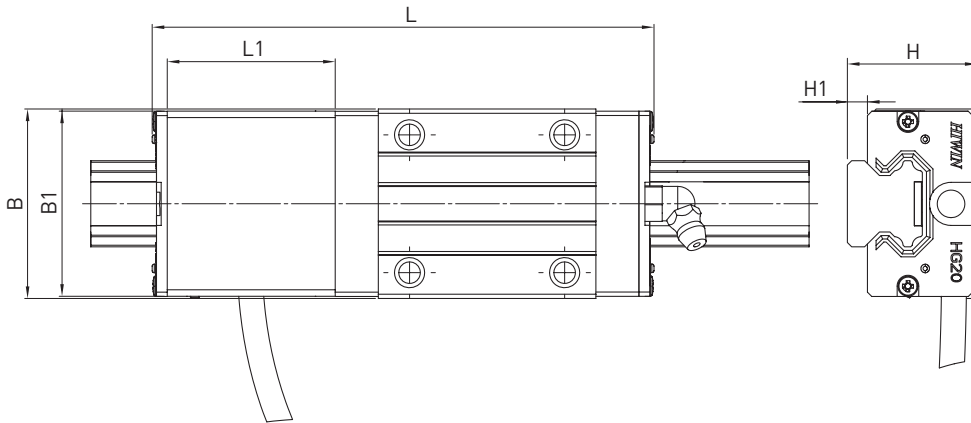


Fig. 8.7 Scale drawing of the HGH20CA block including the MAGIC-PG housing

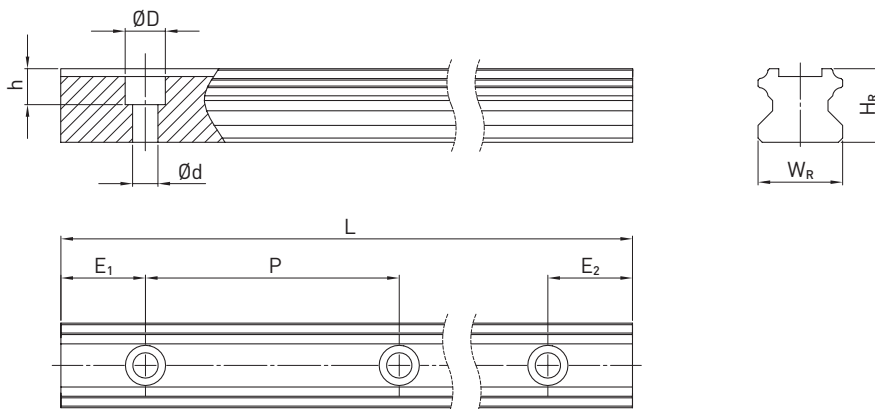
Fig. 8.7 shows an HGH20CA/HGH25CA block. It is also possible to use the modules with HG\_20, HG\_25, QH\_20, QH25, CG\_20 and CG\_25 block sizes (long type and flange type, see the "Linear Guideways" catalogue). The overall dimensions then change accordingly. The dimensions of all block sizes are shown in Table 8.1.

Table 8.1 Dimensions of the block including MAGIC-PG housing

Series/size	L [mm]	L1 [mm]	B [mm]	B1 [mm]	H [mm]	H1 [mm]
HG_20C	118.0	41.5	44	43.0	30	4.6
HG_20H	132.7	41.5	44	43.0	30	4.6
HG_25C	124.5	41.5	48	46.4	40	5.5
HG_25H	145.1	41.5	48	46.4	40	5.5
QH_20C	117.2	41.5	44	43.0	30	4.6
QH_20H	131.9	41.5	44	43.0	30	4.6
QH_25C	123.9	41.5	48	46.4	40	5.5
QH_25H	144.5	41.5	48	46.4	40	5.5
CG_20C	121.4	44.0	44	43.0	30	4.6
CG_20H	137.4	44.0	44	43.0	30	4.6
CG_25C	130.5	44.0	48	47.0	40	6.1
CG_25H	147.9	44.0	48	47.0	40	6.1

### 8.3.2.1 Dimensions of PG rail

Rail with groove, mounting from above (series HG/QH)



# Linear Motors & Distance Measuring Systems

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Table 8.2 Dimensions HGR\_R G1

Series/ Sizes	Mounting bolt for rail [mm]	Dimensions of rail [mm]						Max. length [mm]	Max. length $E_1 = E_2$ [mm]	$E_{1/2}$ min [mm]	$E_{1/2}$ max [mm]	Weight [kg/m]
		$W_R$	$H_R$	D	h	d	P					
HGR20R G1	M5 × 16	20	17.5	9.5	8.5	6.0	60	4,000	3,900	7	53	2.05
HGR25R G1C	M5 × 20	23	22.0	9.5	8.5	6.0	60	4,000	3,900	7	53	3.05

Rail with groove, mounting from below (series HG/QH)

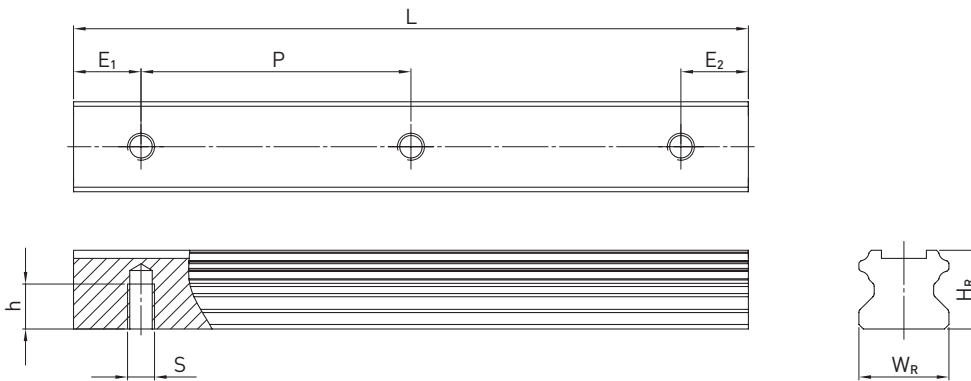


Table 8.3 Dimensions HGR\_T G1

Series/ Size	Dimensions of rail [mm]					Max. length [mm]	Max. length $E_1 = E_2$ [mm]	$E_{1/2}$ min [mm]	$E_{1/2}$ max [mm]	Weight [kg/m]
	$W_R$	$H_R$	S	h	P					
HGR20T G1	20	17.5	M6	10	60	4,000	3,900	7	53	2.13

Rail with groove, mounting from above (series CG)

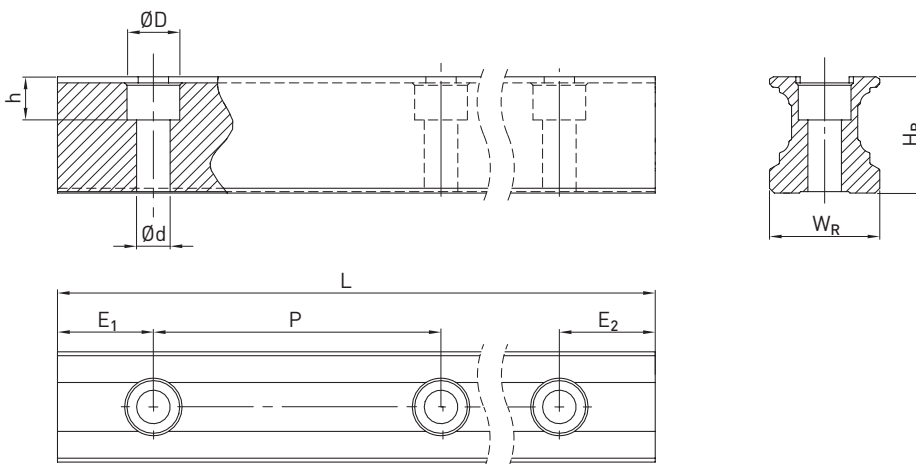


Table 8.4 Dimensions of CGR\_R G1

Series/ size	Dimensions of rail [mm]						Max. length [mm]	Max. length $E_1 = E_2$ [mm]	$E_{1/2}$ min [mm]	$E_{1/2}$ max [mm]	Weight [kg/m]
	$W_R$	$H_R$	D	h	d	P					
CGR20R G1	20	20.55	9.5	8.5	6.0	60	4,000	3,900	7	53	2.05
CGR25R G1	23	24.25	11.0	9.0	7.0	60	4,000	3,900	8	52	3.05



### 8.3.3 Specifications of the distance measuring system HIWIN MAGIC and HIWIN MAGIC-PG

	1 V <sub>PP</sub> (analogue)	TTL (digital)
<b>Electrical properties</b>		
Output signal specification	sin/cos, 1 V <sub>PP</sub> (0.85 V <sub>PP</sub> – 1.2 V <sub>PP</sub> )	Quadrature signal acc. to RS-422
Resolution	Infinite, signal period 1 mm	1 μm
Repeatability bidirectional	0.003 mm	0.002 mm
Absolute accuracy	± 20 μm/m	
Reference signal <sup>1)</sup>	Periodic index impulse at a distance of 1 mm	
Phase angle	90° ± 0.1° el	90°
DC component	2.5 V ± 0.3 V	—
Distortion factor	Typ. < 0.1 %	—
Operating voltage	5 V ± 5 %	
Power consumption	Typ. 35 mA, max. 70 mA	Typ. 70 mA, max. 120 mA
Max. measurement speed	10 m/s	5 m/s
EMC class	3, according to IEC 801	
<b>Mechanical properties</b>		
Housing material	Aluminium alloy, encoder bottom made of stainless steel	
Cable length <sup>2)</sup>	PGH/PGQ: 5,000 mm; PGC: 1,000 mm	
Min. bending radius cable	40 mm	
Protection class	IP67	
Operating temperature	0 °C to +50 °C	
Weight of MAGIC encoder	80 g	
Weight of MAGIC-PG encoder	80 g	
MAGIC-PG suitable for blocks	HG_20, HG_25, QH_20, QH_25, CG_20, CG_25	

<sup>1)</sup> Can be used e.g. with reference switch

<sup>2)</sup> For the use in energy chains we recommend our pre-assembled encoder cable with a pre-mounted round connector M17 (coupling, female) on one side, which matches the optional round plug connector M17 (male) of the encoder. For details, please contact your HIWIN technician.

Properties	MAGIC-PG	MAGIC
Accuracy class <sup>1)</sup>	± 20 μm/m	
Linear expansion coefficient	11.5 × 10 <sup>-6</sup> m/K	
Period	1 mm	
Thickness magnetic scale	1.70 ± 0.10 mm	
Thickness magnetic scale with stainless steel protective cover tape	—	1.85 ± 0.15 mm
Width	10.05 ± 0.10 mm	
Maximum length	24 m	
Magnetic remanence	> 240 mT	
Pole pitch (distance north/south pole)	1 mm	
Single reference marks	Optional	
Material	Elastomers, nitrile and EPDM	
Temperature range	0 °C to +50 °C	
Weight	70 g/m	

<sup>1)</sup> at 20 °C

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## 8.4 Connection analogue and digital variant

### 8.4.1 Cable assignment (analogue and digital variant)

A high-quality, 8-core cable, each V1+, V1-, V2+, V2- and V0+, V0- (or A,  $\bar{A}$ , B,  $\bar{B}$  and Z,  $\bar{Z}$  for the digital variant), is used twisted in pairs.

In energy chains, we generally recommend our pre-assembled extension cables, which are designed especially for such use. The extension cables are supplied with a M17 round plug connector on one end (female coupling) or customised.

### 8.4.2 Formats and outputs

#### Signal format of sine/cosine 1 V<sub>pp</sub> output (analogue)

Electrical signals after the differential input of the downstream electronic components. The sinus/cosinus 1 V<sub>pp</sub> interface of HIWIN MAGIC-PG is strictly based on the Siemens specifications. The period length of the sinus output signal is 1 mm. The period length of the reference signal is 1 mm.

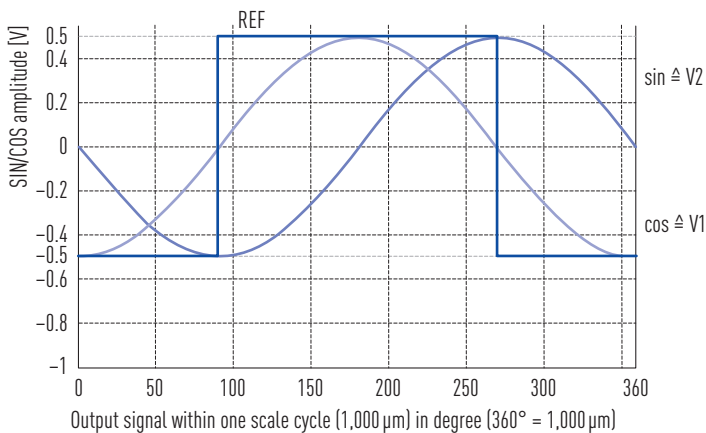


Fig. 8.8 Electrical signals after the differential input of the downstream electronic components (analogue version)

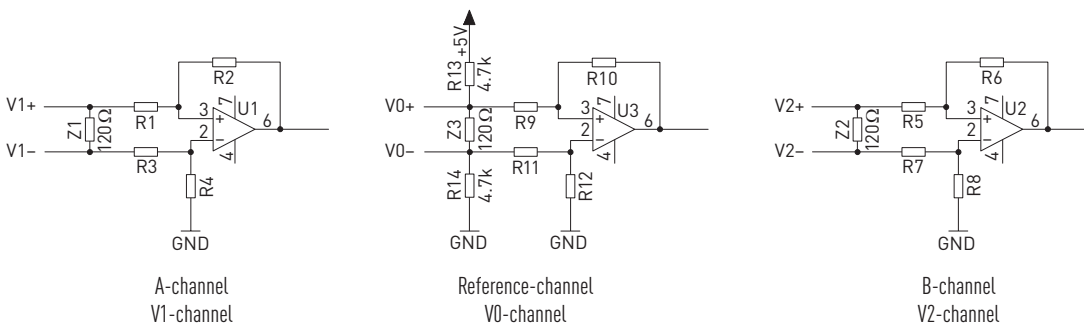


Fig. 8.9 Recommended switching of the subsequent electronic components for sin/cos 1 V<sub>pp</sub> output

#### TTL-output (digital)

The signals on A and B channels have a 90° phase shift (according to RS-422 specification in DIN 66259). Recommended terminal resistance Z = 120 Ω. Output signals: A,  $\bar{A}$ , B,  $\bar{B}$  and Z,  $\bar{Z}$ . Individual reference pulse (optional) and definition of a minimum pulse duration are possible as an option.

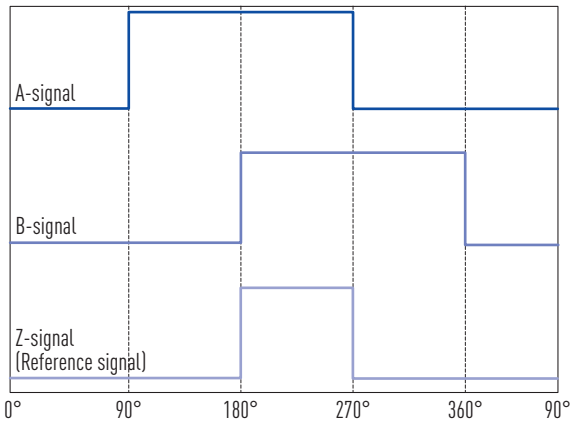


Fig. 8.10 Signals of the MAGIC encoder (TTL version)

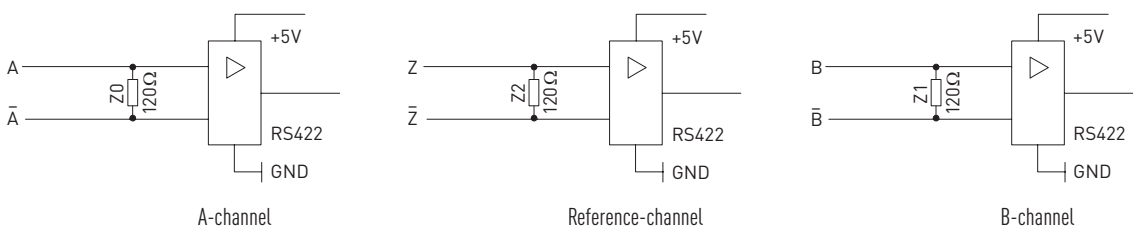


Fig. 8.11 Recommended switching of the subsequent electronic components for digital TTL output

### 8.5 PMED display

Combined with the distance measuring system HIWIN MAGIC or HIWIN MAGIC-PG the PMED display offers the possibility to display the current position of the encoder. In addition the display has 4 relay outputs and one RS-232 interface.

#### Features

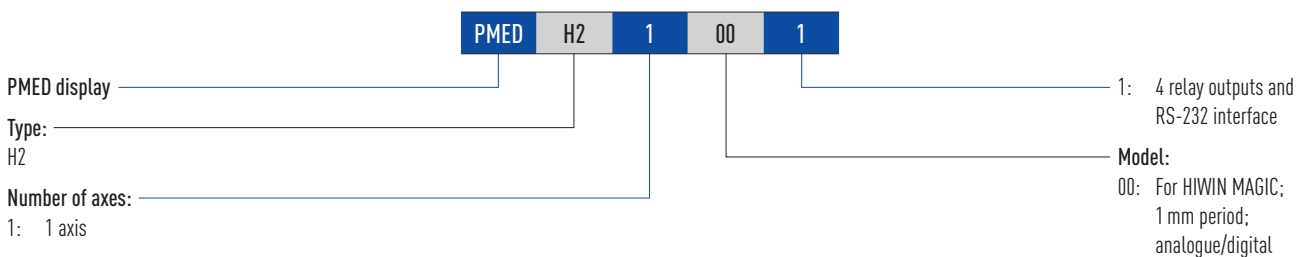
- 8-digit LED display
- For analogue and digital input signal
- Easy handling
- Compact and robust design
- Simple assembly

#### Functions

- Flexible zero point adjustment
- Automatic zero point adjustment in the middle of a travel distance
- Absolute and relative counting function
- Units mm/inch
- 4 switchable relay outputs
- RS-232 interface



#### 8.5.1 Order code for PMED display

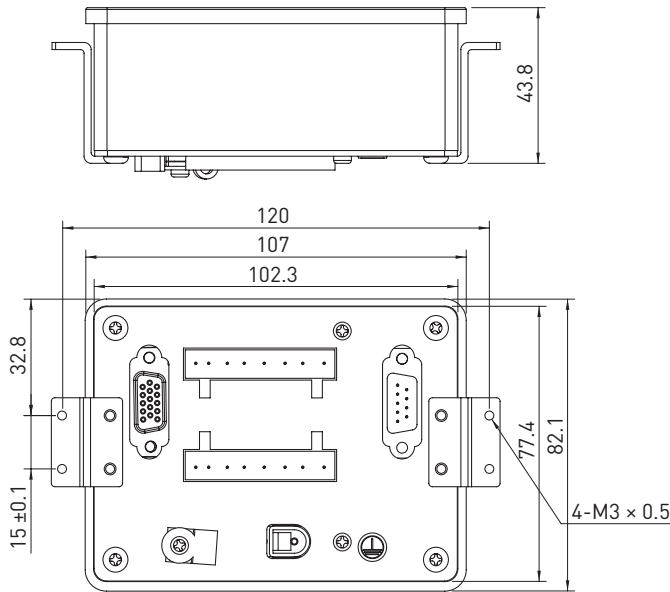


# Linear Motors & Distance Measuring Systems

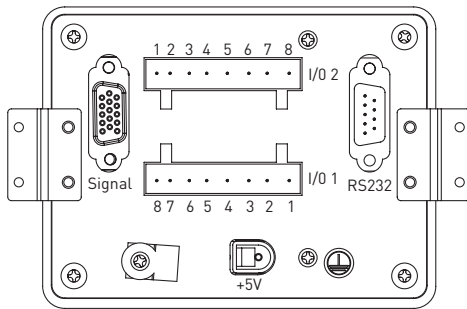
HIWIN MAGIC – magnetic distance measuring systems

## 8.5.2 Technical data of PMED display

### 8.5.2.1 Dimensions of PMED display



### 8.5.2.2 Inputs and outputs



### 8.5.2.3 Signal input connector (HD Sub-D, 15 pin)

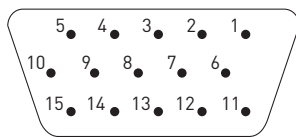


Table 8.7 Pin definition for signal input connector

Pin No.	Signal	Pin-No.	Signal	Pin No.	Signal
1	+5V	6	FG (housing shielding)	11	A+ (analogue)
2	GND	7	Z+ (reference track)	12	A- (analogue)
3	A+ (digital)	8	Z- (reference track)	13	B+ (analogue)
4	B+ (digital)	9	A- (digital)	14	B- (analogue)
5	Not assigned	10	B- (digital)	15	Not assigned

### 8.5.2.4 Signal output connector

Table 8.8 Pin definition for signal output connector

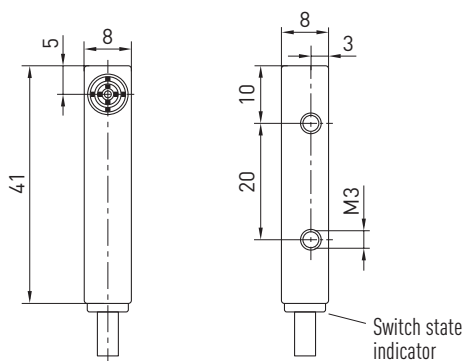
Relay output I/O 1		Relay output I/O 2	
Pin-No.	Signal	Pin-No.	Signal
1	Not assigned	1	Not assigned
2			
3	Not assigned	3	Not assigned
4			
5	Relay 0 (channel 0)	5	Relay 0 (channel 2)
6			
7	Relay 0 (channel 1)	7	Relay 0 (channel 3)
8			

### 8.6 Reference switch

To reference an axis the HIWIN reference switch can be placed at any position of the axis' travel range. The MAGIC and MAGIC-PG encoder delivers a periodic reference signal (index pulse, see Section 8.4.2). With a damped reference switch this signal can be used for the precise referencing of the axis.

#### 8.6.1 Technical data of inductive reference switch

##### 8.6.1.1 Dimensions of reference switch



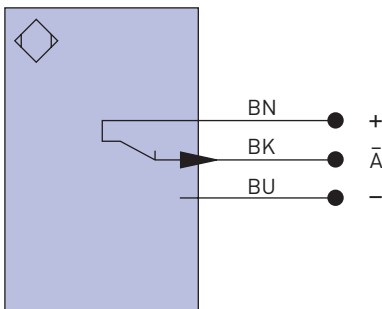
# Linear Motors & Distance Measuring Systems

HIWIN MAGIC – magnetic distance measuring systems

Table 8.9 Reference switch specifications

Inductive	
Switching distance	2 mm
Correction factor V2A/brass/aluminium	1.16/0.70/0.67
Installation type	Flush
Switch hysteresis	< 10 %
Electrical	
Power supply	10 to 30 VDC
Power input (U <sub>b</sub> = 24 V)	< 8 mA
Switching frequency	930 Hz
Temperature drift	< 10 %
Operating temperature	-25 to +80 °C
Voltage drop switch output	< 1 V
Switching current	100 mA
Residual current voltage drop	< 100 µA
Short circuit protection	Yes
Reverse polarity protection	Yes
Overload protection	Yes
Mechanical	
Housing material	Plastic
Full encapsulation	Yes
Protection mode	IP67
Connection type	Cable
Cable length	2 m/4 m
Protection class	III

## 8.6.1.2 Circuit diagram of the optional reference switch



### Explanation of symbols

- + Power supply „+“
- Power supply „0 V“
- $\bar{A}$  Switch output/opener (NC)

### Wire colours

- BN Brown
- BK Black
- BU Blue



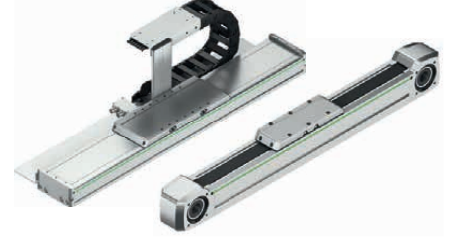
# We live motion.



Linear Guideways



Ballscrews



Linear Axes



Linear Axis Systems



Torque Motors



Robots



Linear Motor Components



Rotary Tables



Drives & Servo Motors

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