



# ALM-T SERIES

- ▶ Small thickness, light weight and high force density
- ▶ Zero cogging force and smooth operation
- ▶ High dynamic response
- ▶ Optional digital hall modules

EN-22.8.1

## Introduction

ALM-T is a kind of ironless linear motor, featuring zero cogging force, light weight and high force density. It's suitable for applications with demanding velocity ripple and dynamic response, as well as force control application.

Continuous force  $F_{cn} = 10N \sim 39N$

Peak force  $F_{pk} = 36N \sim 85N$

## Features

- ▶ Small thickness, light weight and high force density
- ▶ Zero cogging force and smooth operation
- ▶ High dynamic response
- ▶ Optional digital hall modules

## Applications

The ALM-T motors are suitable to be integrated in modules with small thickness, running with light load and high speed, especially in areas such as:

- ▶ Semiconductor
- ▶ Flat panel display
- ▶ Ultra-precision stages
- ▶ Biomedicine / lab automation
- ▶ Optics

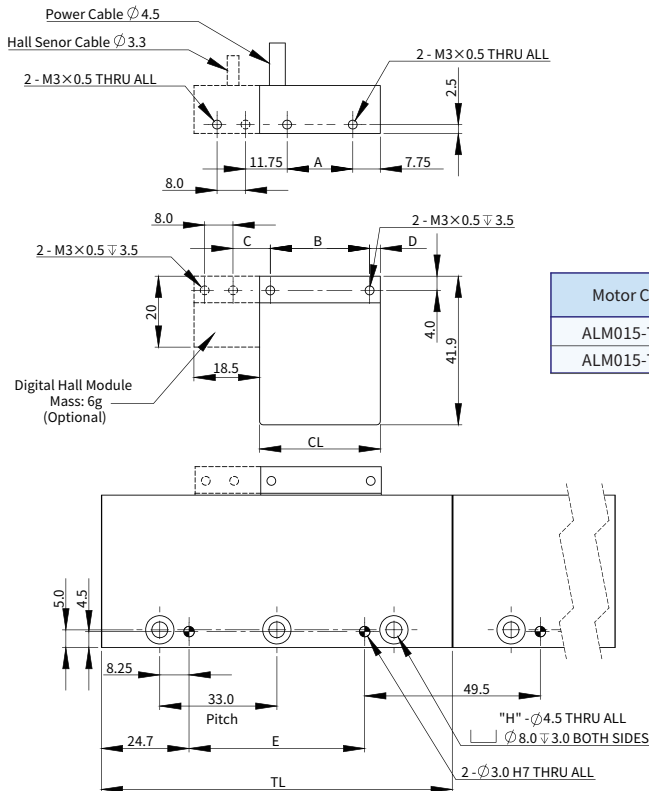
	Model	Coil Length (mm)	● Continuous Force ( $F_{cn}$ ) / ■ Peak Force ( $F_{pk}$ )						Unit: N
			10	15	20	25	30	40	....
	ALM015-T-B1	34	● 10.0 / ■ 36.0						
	ALM015-T-B2	67			● 20.0 / ■ 72.0				
	ALM016-T-B1	49			● 19.5 / ■ 42.5				
	ALM016-T-B2	97						● 39.0 / ■ 85.0	

## ALM015-T

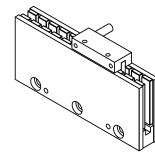
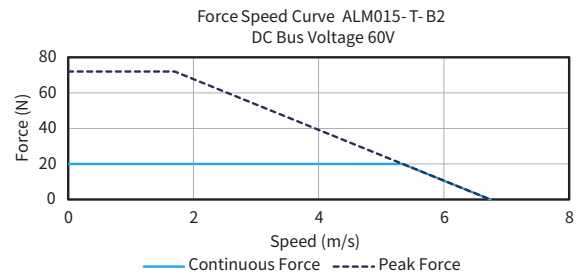
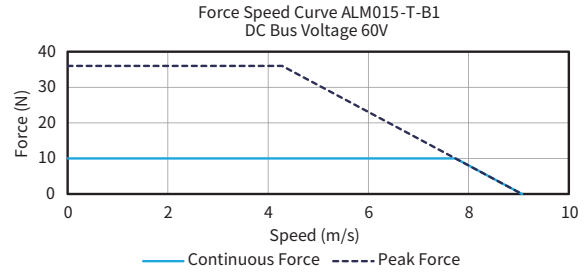
			ALM015-T-B1	ALM015-T-B2
Performance Parameters	Symbol	Unit	M	M
Continuous Force (NC) @100°C <sup>①②</sup>	F <sub>cn</sub>	N	10.0	20.0
Stall Force (NC) @100°C <sup>①③</sup>	F <sub>sn</sub>	N	8.3	16.7
Peak Force	F <sub>pk</sub>	N	36.0	72.0
Force Constant ±10%	K <sub>f</sub>	N/Arms	8.1	10.9
Back EMF Constant ±10%	K <sub>e</sub>	Vpeak/(m/s)	6.6	8.9
Motor Constant @25°C	K <sub>m</sub>	N/Sqrt(W)	3.1	4.3
Resistance (L-L) @25°C ±10% <sup>④</sup>	R <sub>25</sub>	Ω	4.51	4.30
Inductance (L-L) ±30% <sup>⑤</sup>	L	mH	0.58	0.60
Electrical Time Constant	T <sub>e</sub>	ms	0.13	0.14
Continuous current (NC) @100°C <sup>①②</sup>	I <sub>cn</sub>	Arms	1.23	1.83
Stall current (NC) @100°C <sup>①③</sup>	I <sub>sn</sub>	Arms	1.03	1.53
Peak current	I <sub>pk</sub>	Arms	4.4	6.6
Continuous Power Dissipation (NC) @100°C <sup>①②</sup>	P <sub>cn</sub>	W	13.3	28.0
Max. Coil Temperature	T <sub>max</sub>	°C	100.0	100.0
Thermal Dissipation Constant (NC) <sup>①②</sup>	K <sub>thn</sub>	W/°C	0.18	0.37
Max bus Voltage	U <sub>bus</sub>	Vdc	60	60
Magnetic Period	T <sub>MN</sub>	mm	16.5	16.5
Attraction Force	F <sub>a</sub>	N	0.0	0.0
<b>Mechanical Parameters</b>				
Coil Mass (NC) <sup>⑥</sup>	m <sub>cn</sub>	kg	0.028	0.052
Coil Length (NC)	L <sub>cn</sub>	mm	34.0	67.0
Track Mass Per Meter	m <sub>track</sub>	kg/m	3.2	3.2
<b>Other Information</b>				
Insulation Class	Class B (130°C)			
Protection Grade	IP00			
Compliance with Global Standards	RoHS,CE			
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience	Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust			

- ① Measurement is taken at ambient temperature 25°C. Abbreviations: NC-Natural Cooling
  - ② Value depends on the thermal environment. Please consult the technical department for details
  - ③ Minimum heatsink area is 0.03m<sup>2</sup>, and minimum speed is 10mm/s
  - ④ Resistance is measured by DC current with standard 0.5m cable
  - ⑤ Inductance is measured by current frequency of 1kHz
  - ⑥ Coil mass does not include hall module mass
- The contents of datasheet are subject to change without prior notice

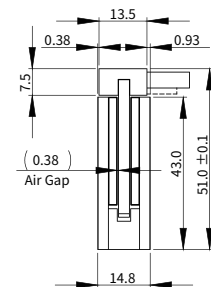
### Dimensional Drawing



### Force-Speed Curve



Motor Coil	Coil Length "CL"	Hole Pitch "A"	Hole Pitch "B"	Hole Pitch "C"	"D"
ALM015-T-B1	34.0	18.5	28.0	10.5	3.0
ALM015-T-B2	67.0	51.5	59.0	11.5	4.0

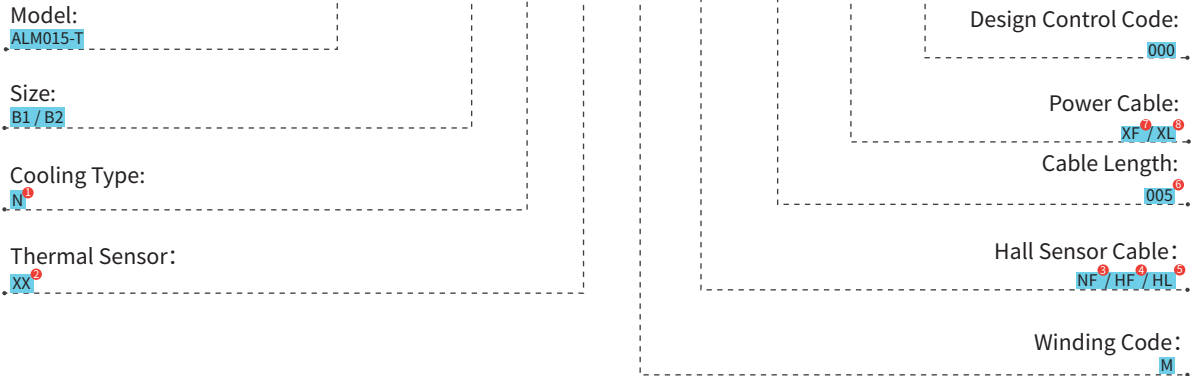


Motor Track	Track Length "TL"	Pin Hole Pitch "E"	No. of Hole "H"
ALM015-T-TL066	65.9	16.5	2
ALM015-T-TL099	98.9	49.5	3
ALM015-T-TL264	263.9	214.5	8

## Part Numbering

### Motor Coil

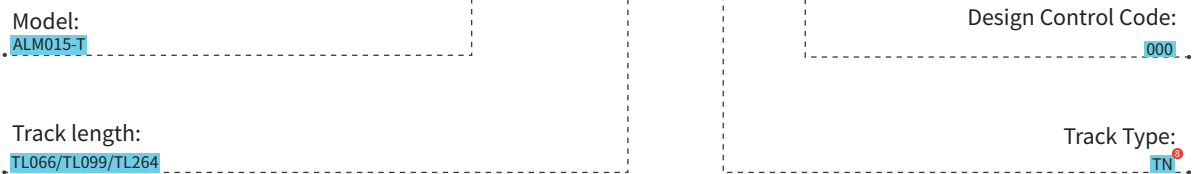
**ALM015-T-B1-N-XX-M-NF-005-XF-000**



- ① N = Natural cooling
- ② XX = No temperature sensor
- ③ NF = Without hall sensor
- ④ HF = With hall sensor & hall cable C/W flying leads
- ⑤ HL = With hall sensor & hall cable C/W MATE-N-LOK plug
- ⑥ 005 = 0.5 meter
- ⑦ XF = Without ferrite bead C/W flying leads
- ⑧ XL = Without ferrite bead C/W MATE-N-LOK plug

### Motor Track

**ALM015-T-TL066-TN-000**



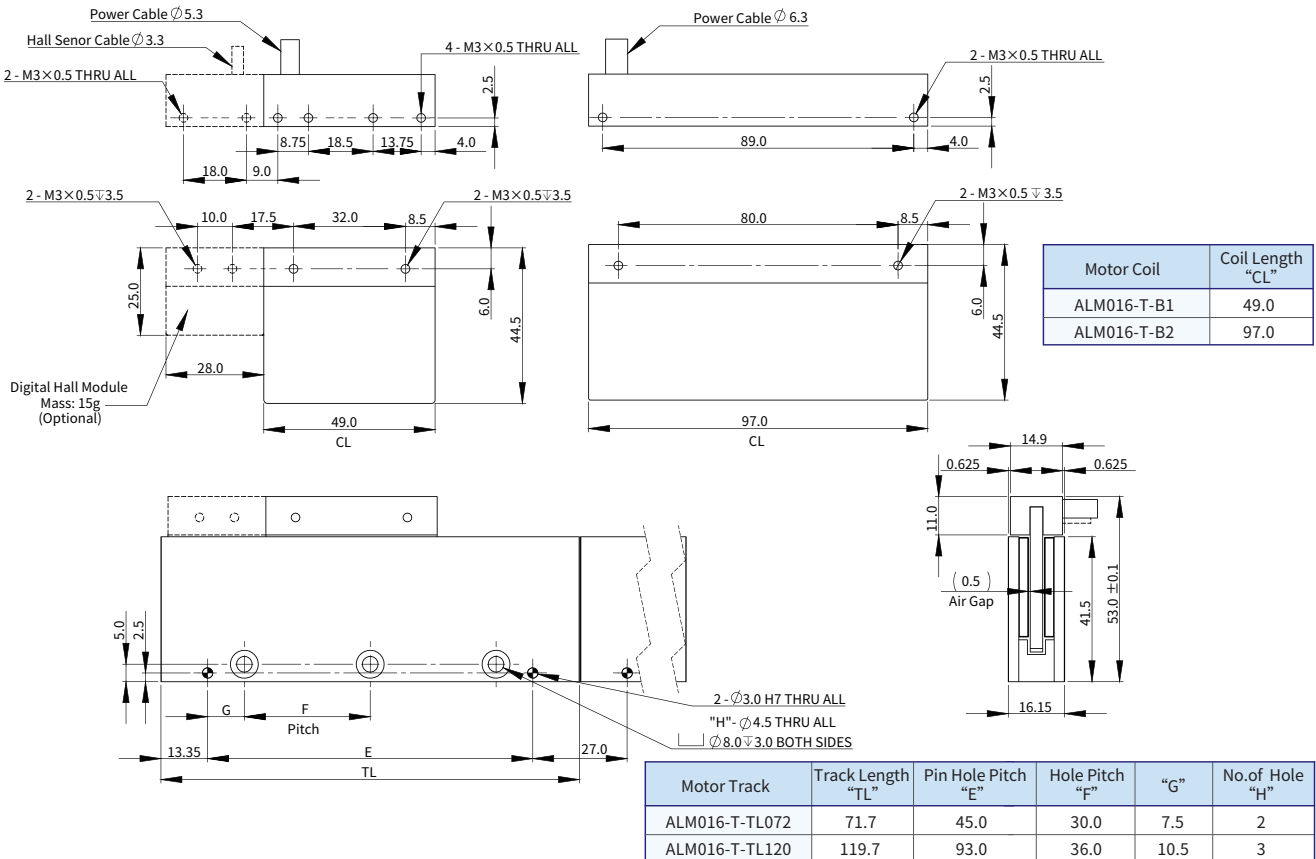
- ① TN = Standard track, no cover

## ALM016-T

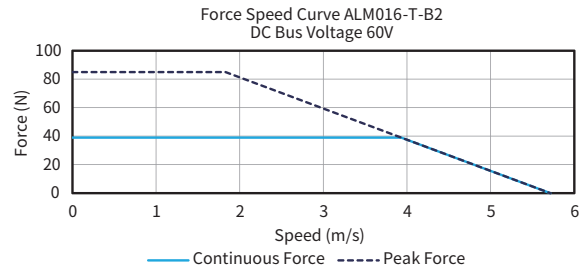
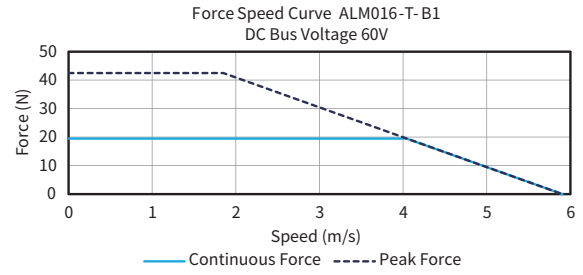
			ALM016-T-B1	ALM016-T-B2
<b>Performance Parameters</b>				
Continuous Force (NC) @100°C <sup>①②</sup>	F <sub>cn</sub>	N	19.5	39.0
Stall Force (NC) @100°C <sup>①③</sup>	F <sub>sn</sub>	N	15.0	30.0
Peak Force	F <sub>pk</sub>	N	42.5	85.0
Force Constant ±10%	K <sub>f</sub>	N/Arms	12.4	12.9
Back EMF Constant ±10%	K <sub>e</sub>	Vpeak/(m/s)	10.2	10.5
Motor Constant @25°C	K <sub>m</sub>	N/Sqrt(W)	3.7	5.4
Resistance (L-L) @25°C ±10% <sup>④</sup>	R <sub>25</sub>	Ω	7.42	3.80
Inductance (L-L) ±30% <sup>⑤</sup>	L	mH	1.65	0.85
Electrical Time Constant	T <sub>e</sub>	ms	0.22	0.22
Continuous current (NC) @100°C <sup>①②</sup>	I <sub>cn</sub>	Arms	1.57	3.03
Stall current (NC) @100°C <sup>①③</sup>	I <sub>sn</sub>	Arms	1.21	2.33
Peak current	I <sub>pk</sub>	Arms	3.4	6.6
Continuous Power Dissipation (NC) @100°C <sup>①②</sup>	P <sub>cn</sub>	W	35.2	67.4
Max. Coil Temperature	T <sub>max</sub>	°C	100.0	100.0
Thermal Dissipation Constant (NC) <sup>①②</sup>	K <sub>thn</sub>	W/°C	0.47	0.90
Max bus Voltage	V <sub>bus</sub>	Vdc	60	60
Magnetic Period	T <sub>M</sub>	mm	24.0	24.0
Attraction Force	F <sub>a</sub>	N	0.0	0.0
<b>Mechanical Parameters</b>				
Coil Mass (NC) <sup>⑥</sup>	m <sub>cn</sub>	kg	0.046	0.090
Coil Length (NC)	L <sub>cn</sub>	mm	49.0	97.0
Track Mass Per Meter	m <sub>track</sub>	kg/m	3.2	3.2
<b>Other Information</b>				
Insulation Class	Class B (130°C)			
Protection Grade	IP00			
Compliance with Global Standards	RoHS,CE			
Ambient Temperature	Operation	0°C to 40°C (non-freezing)		
	Storage	-15°C to 70°C (non-freezing)		
Ambient Humidity	Operation	10%RH to 80%RH (non-condensing)		
	Storage	10%RH to 90%RH (non-condensing)		
Recommended Ambience	Indoor (no direct sunlight); No corrosive gas, inflammable gas, oil mist or dust			

- ① Measurement is taken at ambient temperature 25°C. Abbreviations: NC-Natural Cooling
  - ② Value depends on the thermal environment. Please consult the technical department for details
  - ③ Minimum heatsink area is 0.03m<sup>2</sup>, and minimum speed is 10mm/s
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  - ⑥ Coil mass does not include hall module mass
- The contents of datasheet are subject to change without prior notice

### Dimensional Drawing



### Force-Speed Curve



## Part Numbering

### Motor Coil

**ALM016-T-B1-N-KX-M-NF-005-XF-000**

Model:  
ALM016-T

Size:  
B1 / B2

Cooling Type:  
N

Thermal Sensor:  
KX

Design Control Code:  
000

Power Cable:  
XF / XL

Cable Length:  
005

Hall Sensor Cable:  
NF / HF / HL

Winding Code:  
M

- ① N = Natural cooling
- ② KX = PT100 (RTD)
- ③ NF = Without hall sensor
- ④ HF = With hall sensor & hall cable C/W flying leads
- ⑤ HL = With hall sensor & hall cable C/W MATE-N-LOK plug
- ⑥ 005 = 0.5 meter
- ⑦ XF = Without ferrite bead C/W flying leads
- ⑧ XL = Without ferrite bead C/W MATE-N-LOK plug

### Motor Track

**ALM016-T-TL072-TN-000**

Model:  
ALM016-T

Track length:  
TL072 / TL120

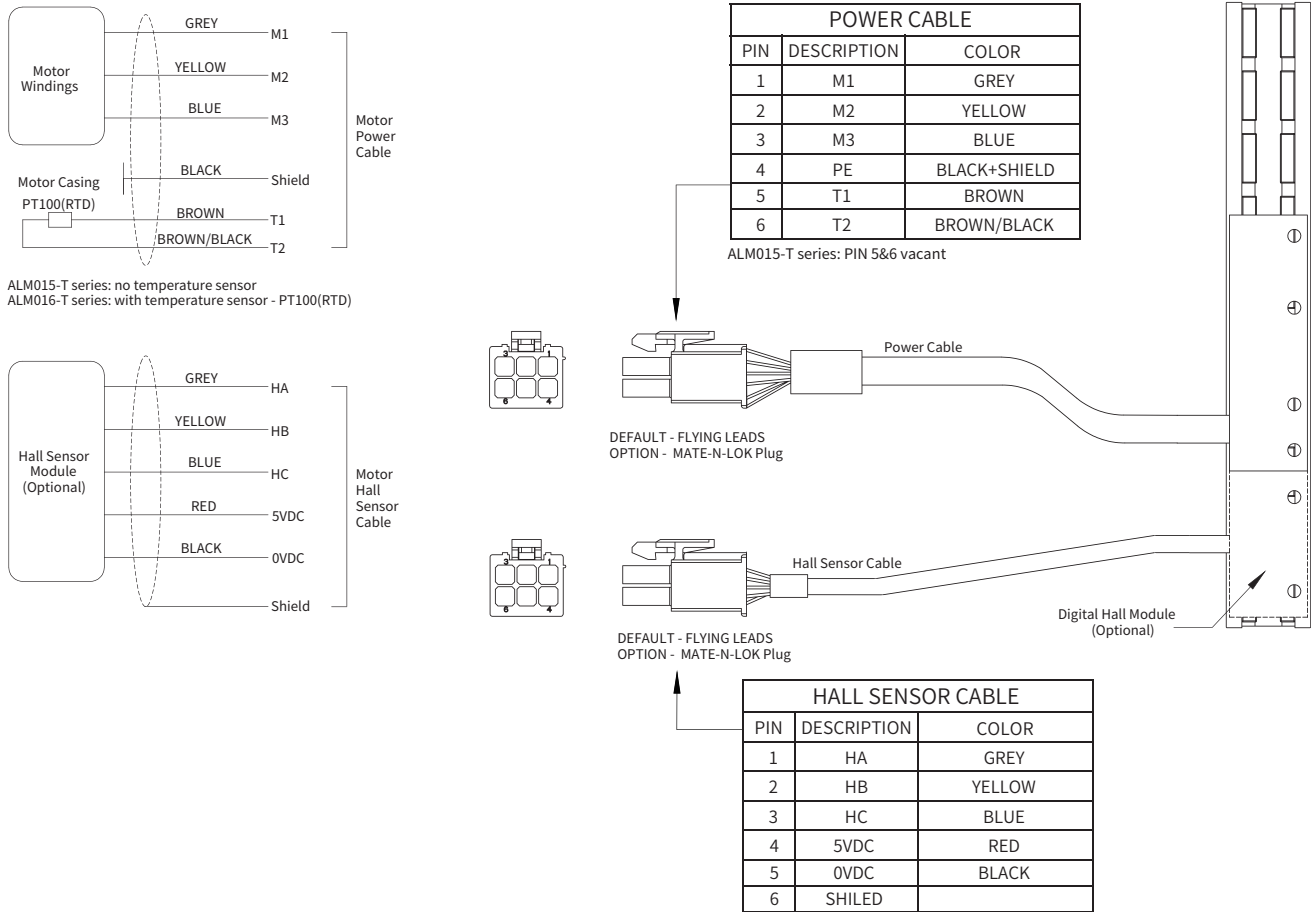
- ① TN = Standard track, no cover

Design Control Code:  
000

Track Type:  
TN

# ALM-T Series

## Motor Cable Connection



## Power Cable Specifications

Motor Type	Outer Diameter (mm)	Min. Bending Radius (Flexible Use)	Min. Bending Radius (Fixed Laying)
ALM015-T-B1	4.5	10× outer diameter	5× outer diameter
ALM015-T-B2	4.5	10× outer diameter	5× outer diameter
ALM016-T-B1	5.3	10× outer diameter	5× outer diameter
ALM016-T-B2	6.3	10× outer diameter	5× outer diameter

## Hall Sensor Cable Specifications

Motor Type	Outer Diameter (mm)	Min. Bending Radius (Flexible Use)	Min. Bending Radius (Fixed Laying)
ALM-T	3.3	10× outer diameter	5× outer diameter

