

# High Performance Stepper Motors

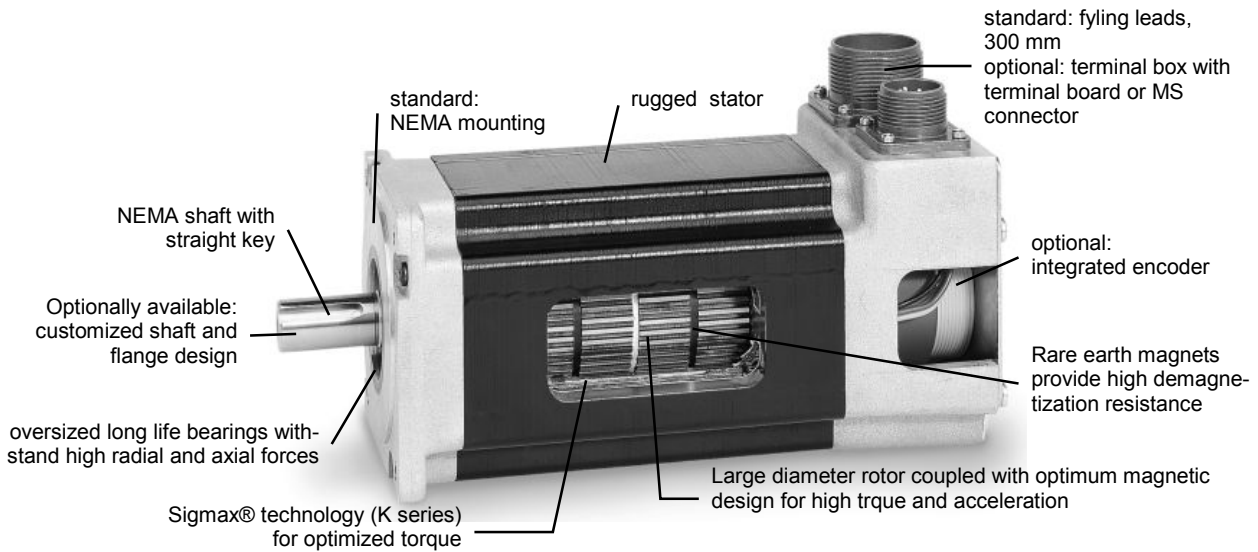
## POWERPAC™



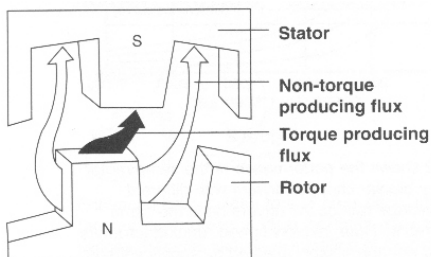
- 2-phase hybrid stepper motor in size NEMA 34 and NEMA 42
- Full steps per revolution angle 1,8°
- Rugged stator design for holding torques up to over 30Nm
- Optimized magnetic design for increased performance
- Protection class IP 44 (optional IP 65, with terminal box)
- Longlife steel bearing bore in front bell
- Optimized housing design for cooling
- Several options such as encoder, holding brake and connectors available

The POWERPAC™ rugged NEMA 34 and NEMA 42 frame hybrid steppers provide an excellent torque to frame size ratio. Optimized magnetics in combination with a new rotor/stator design produce more torque and a higher acceleration. This unique design also features low detent torque for smoother microstepping. Stepper motors equipped with additional magnets in the stator slots for additional torque increase at identical motor size are optionally available (K series, data available separately upon request).

### POWERPAC™ Motor Design

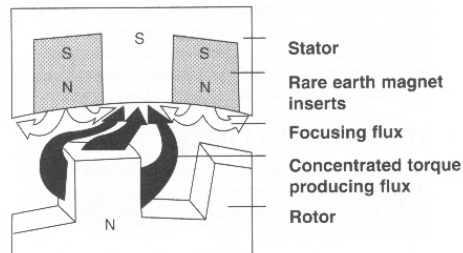


#### N Series Standard Hybrid Step Motor



Typical path of flux transfer in an energized conventional hybrid step motor. Some flux leakage occurs in normal operation.

#### K Series Sigmax® Hybrid Step Motor



Patented Sigmax® technology redirects magnetic flux to inhibit leakage and optimize torque production.

## Technical Data NEMA 34 - N Series

<b>N31HxFy-LNK-NS-00</b>			<b>H</b>	<b>J</b>	<b>K</b>	<b>L</b>
<i>Motor Data</i>						
<b>Holding torque</b> (bipolar/parallel 2 phases on)	<b>M<sub>H</sub></b>	<b>Nm</b>	<b>4,5</b>	<b>4,5</b>	<b>4,7</b>	<b>4,6</b>
<b>Rated current per winding</b> (bipolar/parallel)	<b>I</b>	<b>A</b>	<b>2,8</b>	<b>5,5</b>	<b>6,6</b>	<b>8,6</b>
<i>Technical Data</i>						
Full steps per revolution				200		
Step angle		°	1,8	1,8	1,8	1,8
Angular accuracy		%	3	3	3	3
Phases			2	2	2	2
Winding resistance	R <sub>ph</sub>	Ω	3,1	0,84	0,58	0,36
Winding inductance	L <sub>ph</sub>	mH	12,5	3,5	2,6	1,14
Detent torque	M <sub>P</sub>	Nm	0,13	0,13	0,13	0,13
Insulation class			B	B	B	B
Insulation inductance				100MΩ @ 500V <sub>DC</sub>		
Dielectricity test				500V <sub>DC</sub> 1min		
<i>Mechanical Data</i>						
Rotor inertia	J	Kgm <sup>2</sup> *10 <sup>-3</sup>	0,14	0,14	0,14	0,14
Mass	M	kg	2,3	2,3	2,3	2,3
Length	L	mm	112,8	112,8	112,8	112,8
Ambient temperature		°C		-20 to +40		
Max. surface temperature		°C		95		
Protection class				IP 43		

Please replace the y in the item number by the letter of the requested winding.

<b>N32HxFy-LNK-NS-00</b>			<b>J</b>	<b>K</b>	<b>L</b>	<b>M</b>
<i>Motor Data</i>						
<b>Holding torque</b> (bipolar/parallel 2 phases on)	<b>M<sub>H</sub></b>	<b>Nm</b>	<b>8,4</b>	<b>8,8</b>	<b>8,5</b>	<b>8,6</b>
<b>Rated current per winding</b> (bipolar/parallel)	<b>I</b>	<b>A</b>	<b>5,1</b>	<b>6,1</b>	<b>8,1</b>	<b>10,0</b>
<i>Technical Data</i>						
Full steps per revolution				200		
Step angle		°	1,8	1,8	1,8	1,8
Angular accuracy		%	3	3	3	3
Phases			2	2	2	2
Winding resistance	R <sub>ph</sub>	Ω	1,27	0,9	0,57	0,35
Winding inductance	L <sub>ph</sub>	mH	6,5	5,1	2,6	1,8
Detent torque	M <sub>P</sub>	Nm	0,25	0,25	0,25	0,25
Insulation class			B	B	B	B
Insulation inductance				100MΩ @ 500V <sub>DC</sub>		
Dielectricity test				500V <sub>DC</sub> 1min		
<i>Mechanical Data</i>						
Rotor inertia	J	Kgm <sup>2</sup> *10 <sup>-3</sup>	0,27	0,27	0,27	0,27
Mass	M	kg	3,8	3,8	3,8	3,8
Length	L	mm	151,4	151,4	151,4	151,4
Ambient temperature		°C		-20 to +40		
Max. surface temperature		°C		95		
Protection class				IP 43		

Please replace the y in the item number by the letter of the requested winding.

**N33HxFy-LNK-NS-00**

			<b>J</b>	<b>K</b>	<b>L</b>	<b>M</b>
<i>Motor Data</i>						
<b>Holding torque</b> (bipolar/parallel 2 phases on)	<b>M<sub>H</sub></b>	<b>Nm</b>	12,1	12,4	13,0	12,1
<b>Rated current per winding</b> (bipolar/parallel)	<b>I</b>	<b>A</b>	5,0	6,1	9,0	9,9
<i>Technical Data</i>						
Full steps per revolution				200		
Step angle		°	1,8	1,8	1,8	1,8
Angular accuracy		%	3	3	3	3
Phases			2	2	2	2
Winding resistance	R <sub>ph</sub>	Ω	1,65	1,12	0,53	0,44
Winding inductance	L <sub>ph</sub>	mH	9,0	6,4	3,4	2,3
Detent torque	M <sub>P</sub>	Nm	0,38	0,38	0,38	0,38
Insulation class			B	B	B	B
Insulation inductance				100MΩ @ 500V <sub>DC</sub>		
Dielectricity test				500V <sub>DC</sub> 1min		
<i>Mechanical Data</i>						
Rotor inertia	J	Kgm <sup>2</sup> *10 <sup>-3</sup>	0,4	0,4	0,4	0,4
Mass	m	kg	5,4	5,4	5,4	5,4
Length	L	mm	155,7	155,7	155,7	155,7
Ambient temperature		°C		-20 to +40		
Max. surface temperature		°C		95		
Protection class				IP 43		

Please replace the y in the item number by the letter of the requested winding.

**N34HxFy-LNK-NS-00**

			<b>J</b>	<b>K</b>	<b>L</b>	<b>M</b>
<i>Motor Data</i>						
<b>Holding torque</b> (bipolar/parallel 2 phases on)	<b>M<sub>H</sub></b>	<b>Nm</b>	15,3	14,36	15,4	15,1
<b>Rated current per winding</b> (bipolar/parallel)	<b>I</b>	<b>A</b>	5,5	6,0	8,7	11,3
<i>Technical Data</i>						
Full steps per revolution				200		
Step angle		°	1,8	1,8	1,8	1,8
Angular accuracy		%	3	3	3	3
Phases			2	2	2	2
Winding resistance	R <sub>ph</sub>	Ω	1,6	1,35	0,66	0,41
Winding inductance	L <sub>ph</sub>	mH	11,5	8,1	4,7	2,6
Detent torque	M <sub>P</sub>	Nm	0,4	0,4	0,4	0,4
Insulation class			B	B	B	B
Insulation inductance				100MΩ @ 500V <sub>DC</sub>		
Dielectricity test				500V <sub>DC</sub> 1min		
<i>Mechanical Data</i>						
Rotor inertia	J	Kgm <sup>2</sup> *10 <sup>-3</sup>	0,53	0,53	0,53	0,53
Mass	m	kg	6,8	6,8	6,8	6,8
Length	L	mm	195,1	195,1	195,1	195,1
Ambient temperature		°C		-20 to +40		
Max. surface temperature		°C		95		
Protection class				IP 43		

Please replace the y in the item number by the letter of the requested winding.

## Technical Data NEMA 42 - N Series

<b>N41HxFy-LNK-NS-00</b>			<b>J</b>	<b>L</b>	<b>M</b>
<i>Motor Data</i>					
<b>Holding torque</b> (bipolar/parallel 2 phases on)	<b>M<sub>H</sub></b>	<b>Nm</b>	11,5	11,5	11,7
<b>Rated current per winding</b> (bipolar/parallel)	<b>I</b>	<b>A</b>	5,5	8,7	10,7
<i>Technical Data</i>					
Full steps per revolution				200	
Step angle		°	1,8	1,8	1,8
Angular accuracy		%	3	3	3
Phases			2	2	2
Winding resistance	R <sub>ph</sub>	Ω	1,16	0,47	0,31
Winding inductance	L <sub>ph</sub>	mH	10,1	3,4	2,8
Detent torque	M <sub>P</sub>	Nm	0,3	0,3	0,3
Insulation class			B	B	B
Insulation inductance				100MΩ @ 500V <sub>DC</sub>	
Dielectricity test				500V <sub>DC</sub> 1min	
<i>Mechanical Data</i>					
Rotor inertia	J	Kgm <sup>2</sup> *10 <sup>-3</sup>	0,55	0,55	0,55
Mass	m	kg	5,0	5,0	5,0
Length	L	mm	132,1	132,1	132,1
Ambient temperature		°C		-20 to +40	
Max. surface temperature		°C		95	
Protection class				IP 43	

Please replace the y in the item number by the letter of the requested winding.

<b>N42HxFy-LNK-NS-00</b>			<b>K</b>	<b>L</b>	<b>M</b>	<b>N</b>
<i>Motor Data</i>						
<b>Holding torque</b> (bipolar/parallel 2 phases on)	<b>M<sub>H</sub></b>	<b>Nm</b>	21,9	21,8	22,2	22,1
<b>Rated current per winding</b> (bipolar/parallel)	<b>I</b>	<b>A</b>	6,4	8,1	9,9	15,8
<i>Technical Data</i>						
Full steps per revolution				200		
Step angle		°	1,8	1,8	1,8	1,8
Angular accuracy		%	3	3	3	3
Phases			2	2	2	2
Winding resistance	R <sub>ph</sub>	Ω	1,2	0,75	0,51	0,21
Winding inductance	L <sub>ph</sub>	mH	12,8	7,8	5,5	2,1
Detent torque	M <sub>P</sub>	Nm	0,59	0,59	0,59	0,59
Insulation class			B	B	B	B
Insulation inductance				100MΩ @ 500V <sub>DC</sub>		
Dielectricity test				500V <sub>DC</sub> 1min		
<i>Mechanical Data</i>						
Rotor inertia	J	Kgm <sup>2</sup> *10 <sup>-3</sup>	1,09	1,09	1,09	1,09
Mass	m	kg	8,3	8,3	8,3	8,3
Length	L	mm	183,4	183,4	183,4	183,4
Ambient temperature		°C		-20 to +40		
Max. surface temperature		°C		95		
Protection class				IP 43		

Please replace the y in the item number by the letter of the requested winding.

N43HxFy-LNK-NS-00			K	L	M	N
<i>Motor Data</i>						
<b>Holding torque</b> (bipolar/parallel 2 phases on)	<b>M<sub>H</sub></b>	<b>Nm</b>	30,6	30,0	30,5	30,8
<b>Rated current per winding</b> (bipolar/parallel)	<b>I</b>	<b>A</b>	6,2	8,0	9,9	15,4
<i>Technical Data</i>						
Full steps per revolution				200		
Step angle		°	1,8	1,8	1,8	1,8
Angular accuracy		%	3	3	3	3
Phases			2	2	2	2
Winding resistance	R <sub>ph</sub>	Ω	1,65	0,99	0,66	0,28
Winding inductance	L <sub>ph</sub>	mH	19,6	11,0	7,7	3,2
Detent torque	M <sub>P</sub>	Nm	0,75	0,75	0,75	0,75
Insulation class			B	B	B	B
Insulation inductance				100MΩ @ 500V <sub>DC</sub>		
Dielectricity test				500V <sub>DC</sub> 1min		
<i>Mechanical Data</i>						
Rotor inertia	J	Kgm <sup>2</sup> *10 <sup>-3</sup>	1,62	1,62	1,62	1,62
Mass	m	kg	11,6	11,6	11,6	11,6
Length	L	mm	234,4	234,4	234,4	234,4
Ambient temperature		°C		-20 to +40		
Max. surface temperature		°C		95		
Protection class				IP 43		

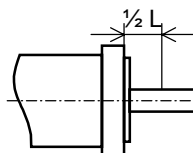
Please replace the y in the item number by the letter of the requested winding.

### Standard Version

- NEMA 34 and NEMA 42
- Shaft with straight keyway
- 8 flying leads for serial or parallel connection
- single shaft (version ...-LNN-...)
- alternative with double shaft (version ...-LDN-...)
- CE certification
- UL certification (motor insulation class B, File E03510)

Further types and options for this series as well as stepper drives and other accessories are available upon request.

### Radial and Axial Shaft Loading



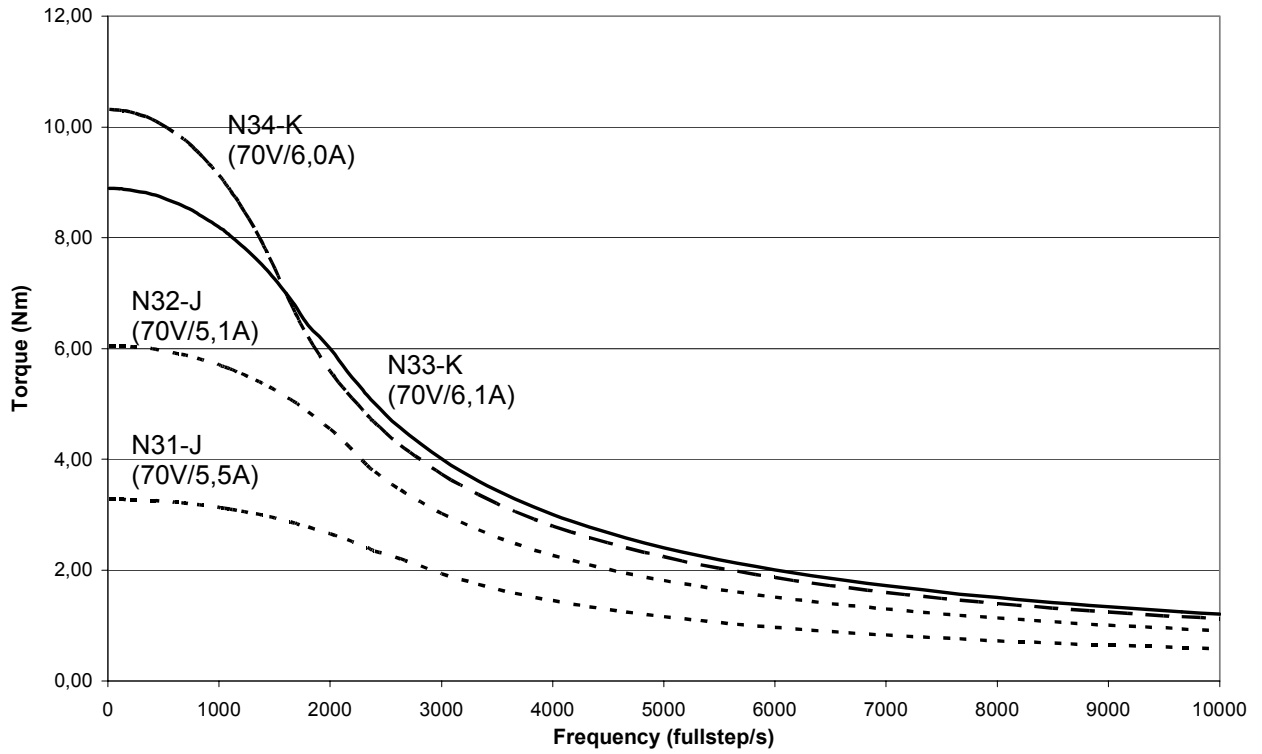
regarding to half the shaft length distance to the bearing

Motor size	Max. axial load	Max. radial load
31, 32	1355N	290N
33, 34	1355N	490N
41	1800N	560N
42, 43	1800N	490N

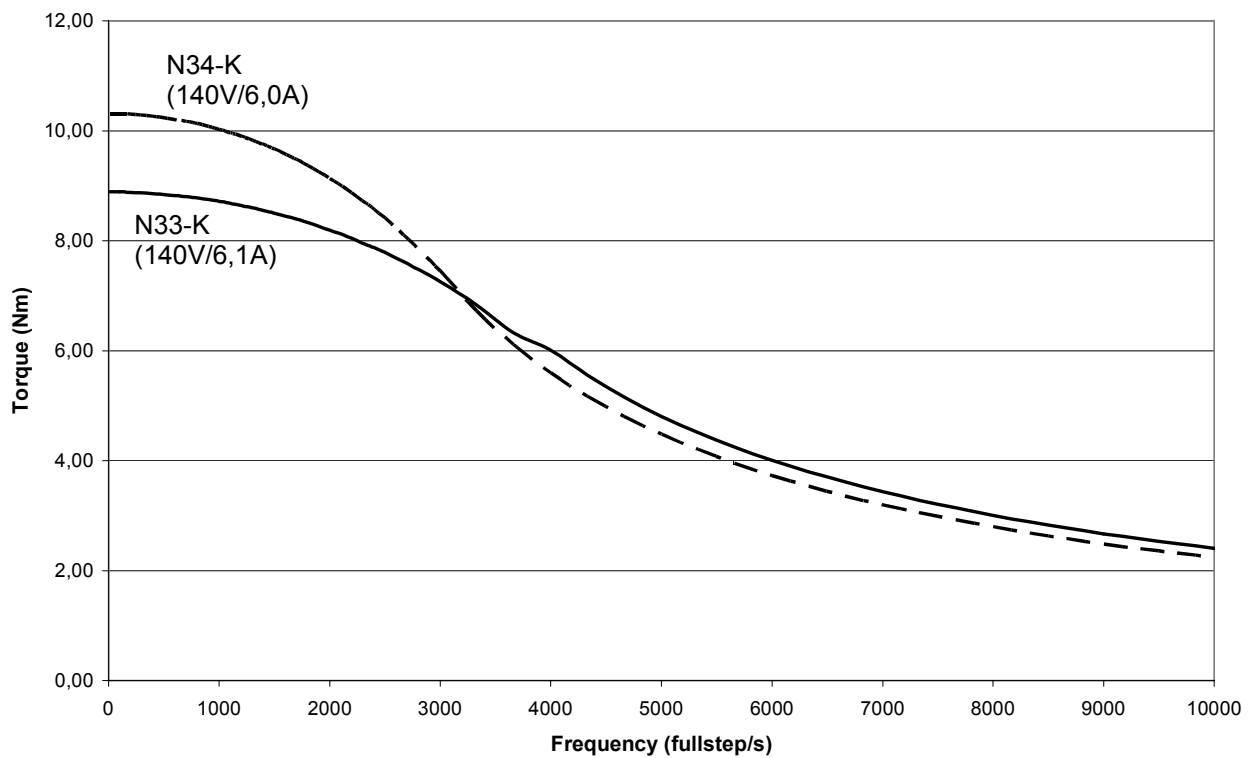
### Torque Characteristics

(connection bipolar, parallel)

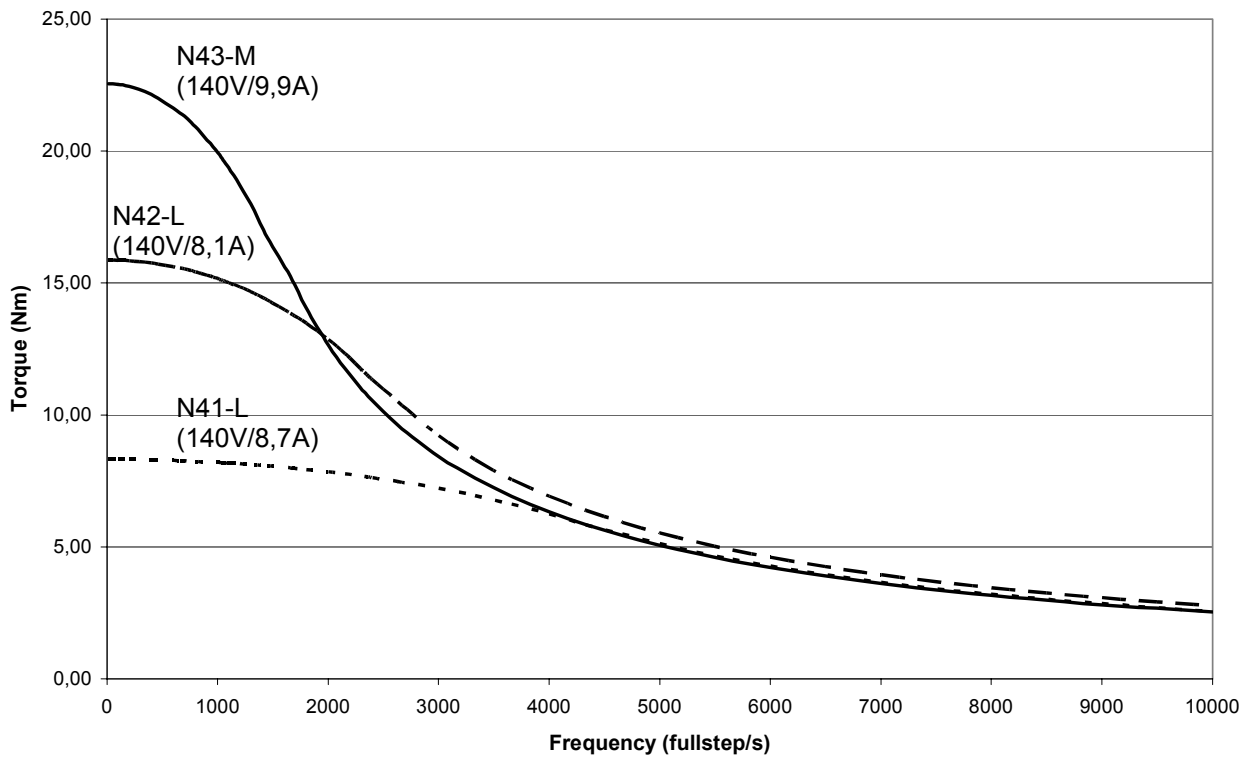
Size N3 (selected windings, at 70V)



Size N3 (selected windings, at 140V)



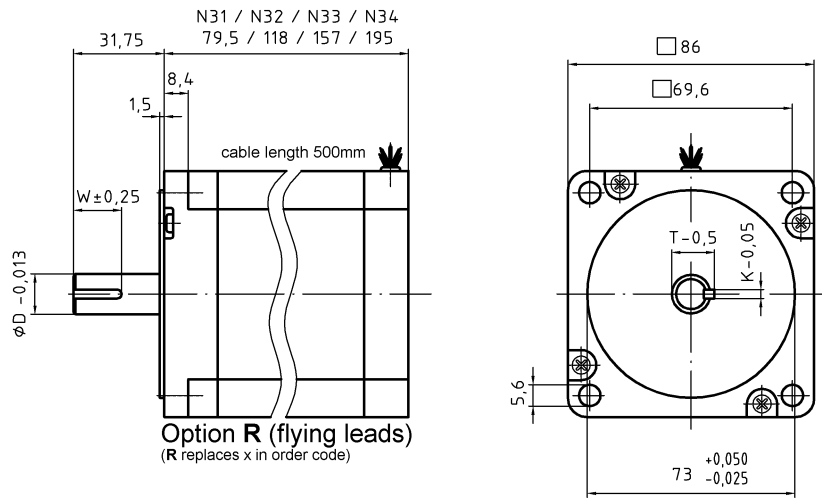
Size N4 (selected windings)



## Dimensions Size N3 (NEMA 34)

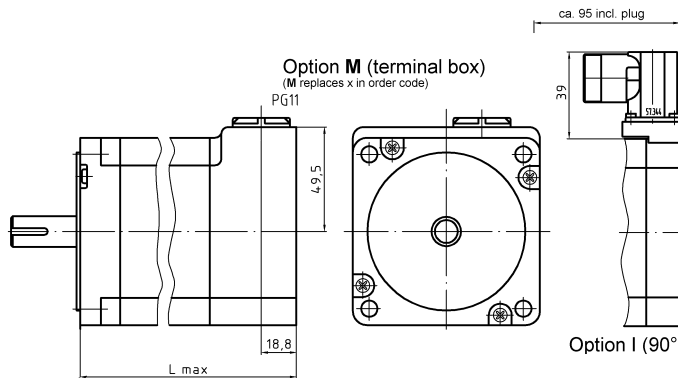
all measures in mm

### Standard Version



Option R (flying leads)  
(R replaces x in order code)

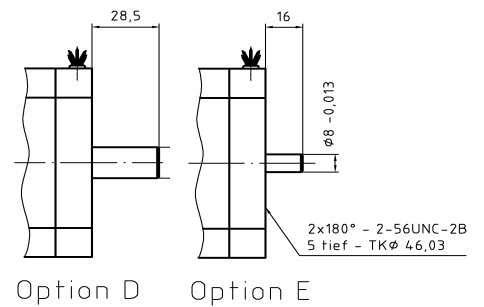
### Connector Options



Option M (terminal box)  
(M replaces x in order code)

Option I (90°)

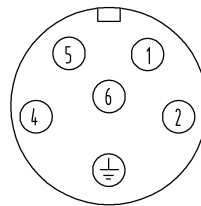
### Shaft Options



Option D

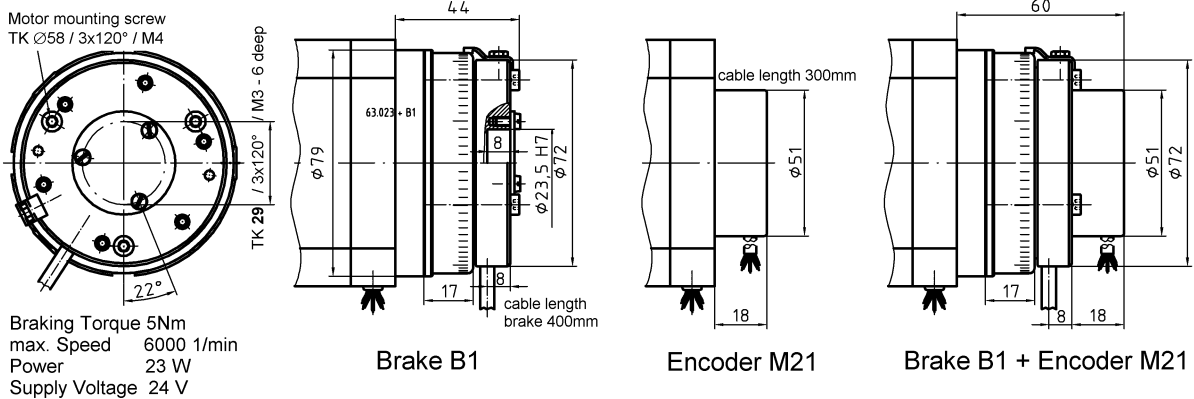
Option E

Type	L <sub>max</sub>	∅D -0,013	Keyway		
			W	T	K
N31	112,8	12,7	23,82	14,1	3,175
N32	151,4	12,7			
N33	190	15,875	24,61	17,9	4,763
N34	228,4	15,875			



PIN-No.	Wiring	
	parallel	serial
1	black/white + orange	black
2	orange/white + black	orange
4	red/white + yellow	yellow
5	yellow/white + red	red
	PE	PE

### Mounting Options



Braking Torque 5Nm  
max. Speed 6000 1/min  
Power 23 W  
Supply Voltage 24 V

Brake B1

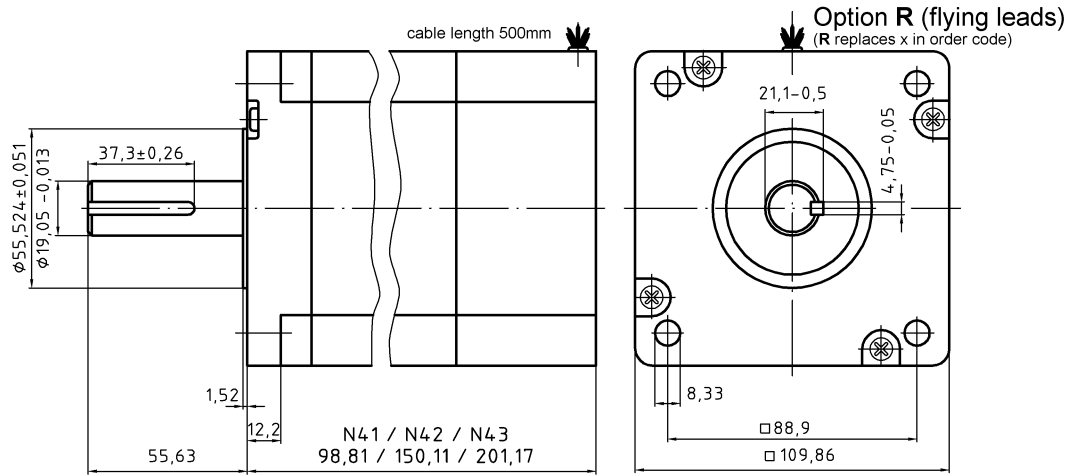
Encoder M21

Brake B1 + Encoder M21

### Dimensions Size N4 (NEMA 42)

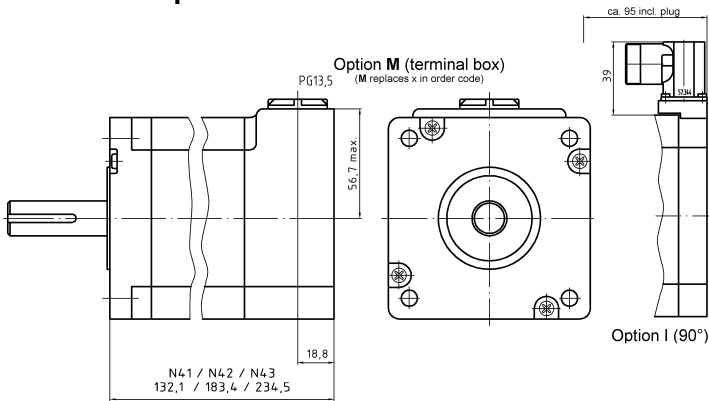
all measures in mm

#### Standard Version

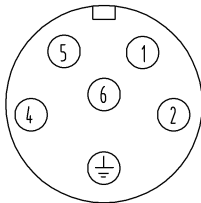
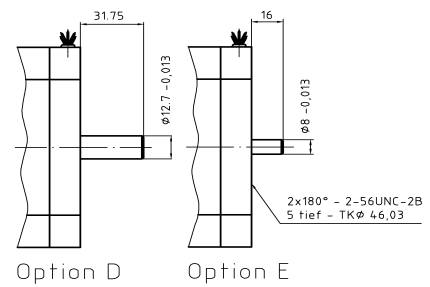


Option R (flying leads)  
(R replaces x in order code)

#### Connector Options

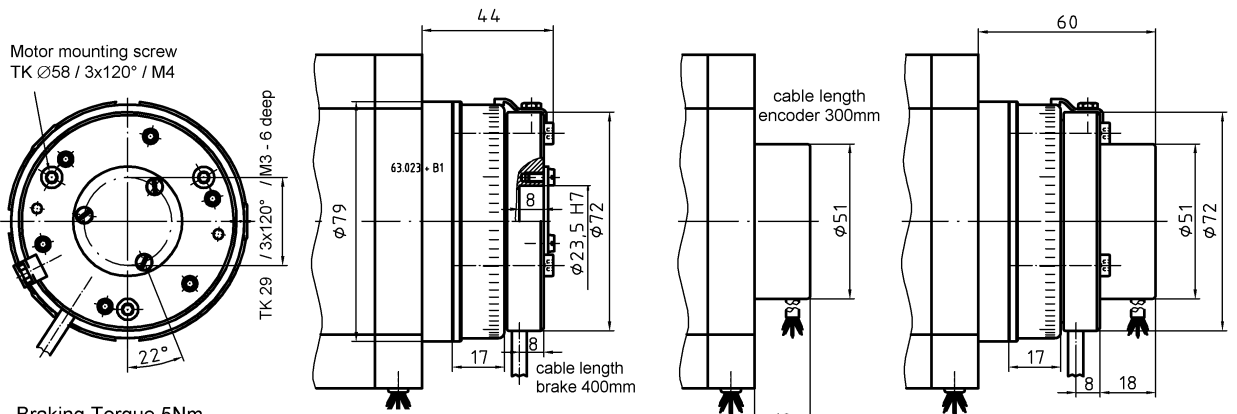


#### Shaft Options



PIN-No.	Wiring	
	parallel	serial
1	black/white + orange	black
2	orange/white + black	orange
4	red/white + yellow	yellow
5	yellow/white + red	red
	PE	PE

#### Mounting Options

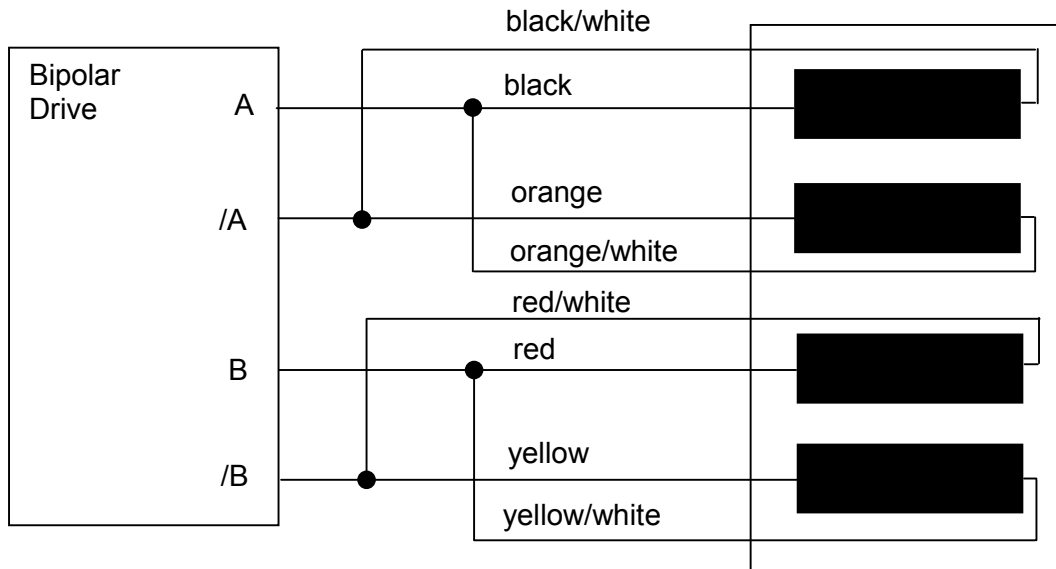


Motor mounting screw  
TK Ø58 / 3x120° / M4

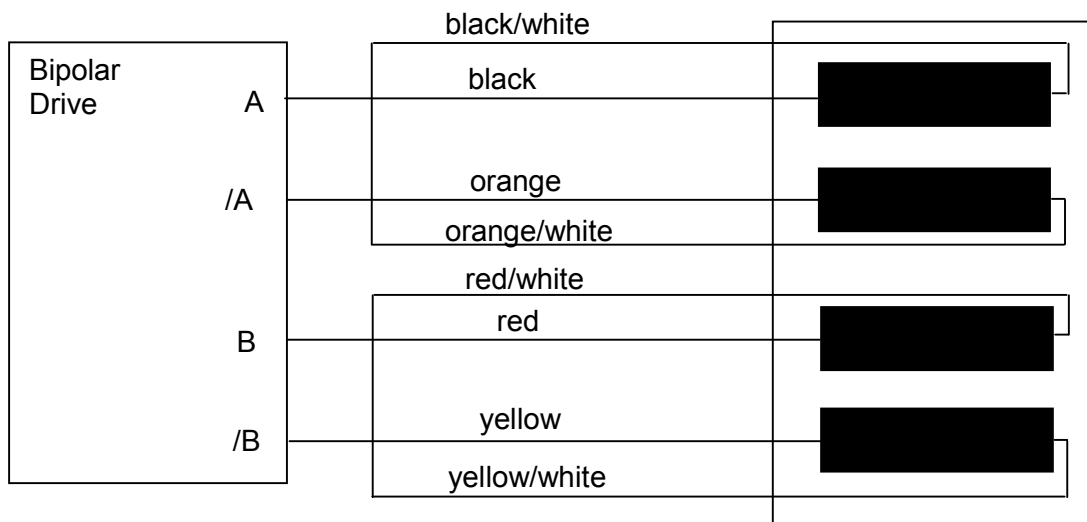
Braking Torque 5Nm  
max. Speed 6000 1/min  
Power 23 W  
Supply Voltage 24 V

# Terminal Assignment

## 8 Leads parallel:



## 8 Leads seriell:



**Note:** At motors with 4 leads only the black, orange, red and yellow leads are coming out of the motor.

## Sales and Service

We are committed to quality customer service. In order to serve you in the most effective way please contact your local sales representative for assistance.

If you do not know the local sales representative please contact our customer support.

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