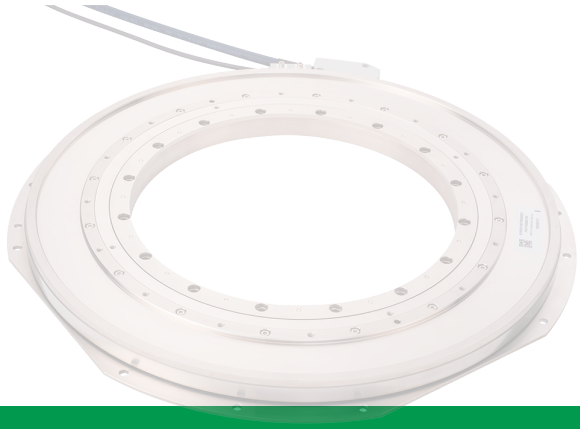
HIWIN® MIKROSYSTEM



Direct Drive Motor

Technical Information

HIWIN Support

About HIWIN

HIWIN®

Linear Motor System

Automated Transport / AOI Application / Precision Positioning / Semiconductor Application

- Air Bearing Platform
- XY Stage
- Gantry Systems
- Single-Axis Linear Motor Stage

Linear Motor

Machine Tool / Semiconductor / Touch Panel / Laser Manufacturing Machine / Glass Cutting Machine

- Iron Core Linear Motor-LMSA, LMSA-Z, LMFA, LMFC, LMFP, LME Series
- Ironless Linear Motor-LMC Series
- Tubular Motor-LMT Series

Torque Motor / Direct Drive Motor

Machine Tools / Lithium-ion Battery / Gear Machining and Inspection

- Torque Motor-TM-5 / IM-2, TMRW, TM-5 (J0) Series

Display / Automation / Semiconductor / Lithium-ion Battery / Robot / Laser Cutting / AOI Inspection

- Direct Drive Motor-DMS, DMY, DMN, DMT, DMH Series

Controller / Drive / AC Servo Motor

Semiconductor / SMT / 3C Electronics / Automation Equipment / New Energy Equipment / Industrial Machinery

- Controller-HIMC3
- Drive-E1, E2, D1, D2T/D2T-LM Series
- AC Servo Motor-E, FR Series

Linear Actuator / Servo Actuator

Medical / Automation / Electric Servo Press / Barrier-free Equipment Industry

- Servo Actuator-LAA Series
- Linear Actuator-LAM, LAS, LAN, LAC Series

Position Measurement System

PCB / Automobile Automation / Automation / Solar Process Equipment / Laser Cutting

- High Resolution-PM, APM Series
- Signal Translator
- High Performance Counter

Semiconductor Subsystem

Semiconductor / LED / Panel

- EFEM (Equipment Front End Module)
- Wafer Robot
- Load Port
- Wafer Aligner

Multi-Axis Robot

Pick-and-Place / Assembly / Array and Packaging / Semiconductor / Electro-Optical Industry / Automotive Industry / Food Industry

- Articulated Robot
- SCARA Robot
- Electric Gripper
- Integrated Electric Gripper

Single-Axis Robot

Precision / Semiconductor / Medical / FPD

- KK, SK
- KS, KA
- KU, KE, KC

Torque Motor Rotary Table

Medical / Automotive Industry / Machine Tools / Machinery Industry

- RAB Series
- RAS Series
- RCV Series
- RCH Series

Wire-cut EDM / Die-sinker EDM / Small-hole Drilling EDM

- RAS-E Series
- RCV-E Series
- RCH-E Series

Ballscrew

Precision Ground / Rolled

- Super S Series
- Super T Series
- Mini Roller
- Ecological & Economical Lubrication Module E2
- Auxiliary Lubrication Module EL
- Rotating Nut (R1, R2)
- Energy-Saving & Thermal-Controlling (Cool Type)
- Heavy Load Series (RD)

Linear Guideway

Automation / Semiconductor / Medical

- Ball Type-HG, EG, WE, MG, CG
- Quiet Type-QH, QE, QW, QR
- Other-RG, E2, PG, SE, RC

Configurator Chart

Series	External diameter (mm)	Hollow shaft diameter (mm)	Encoder type	Spec page	Dimensions page	Peak torque(Nm)																					
						0.96	1.92	4.2	8.4	9	12	18	24	30	40	45	60	75	90	120	141	150	180	225	282	300	450
DMY	110	35	Absolute	P.11	P.11						 DMY44-C/E (H:123)		 DMY48-C/E (H:163)															
	170	45	Absolute	P.12	P.13								 DMY63-C/E (H:109.5)			 DMY65-C/E (H:134.5)		 DMY68-C/E (H:159.5)									
	280	85	Absolute	P.14	P.15													 DMYA3-C/E (H:120)				 DMYA5-C/E (H:145)				 DMYAA-C/E (H:200)	
	170	45	Incremental	P.12	P.13								 DMY63-5 (H:109.5)			 DMY65-5 (H:134.5)		 DMY68-5 (H:159.5)									
	280	60	Incremental	P.14	P.15													 DMYA3-5 (H:120)				 DMYA5-5 (H:145)				 DMYAA-5 (H:200)	
DMN	65	12	Absolute	P.19	P.21	 DMN21-C/E (H:60)	 DMN22-C/E (H:71.5)																				
	118	12	Absolute	P.20	P.21			 DMN42-C/E (H:45)	 DMN44-C/E (H:65)																		
	160	35	Absolute	P.22	P.23						 DMN71-C/E (H:50)																
	212	50	Absolute	P.22	P.23										 DMN93-C/E (H:55)												
	65	12	Incremental	P.19	P.21	 DMN21-2 (H:60)	 DMN22-2 (H:71.5)																				
	118	12	Incremental	P.20	P.21			 DMN42-2 (H:45)	 DMN44-2 (H:65)																		
	160	35	Incremental	P.22	P.23						 DMN71-4 (H:50)																
	212	50	Incremental	P.22	P.23										 DMN93-5 (H:55)												

Configurator Chart

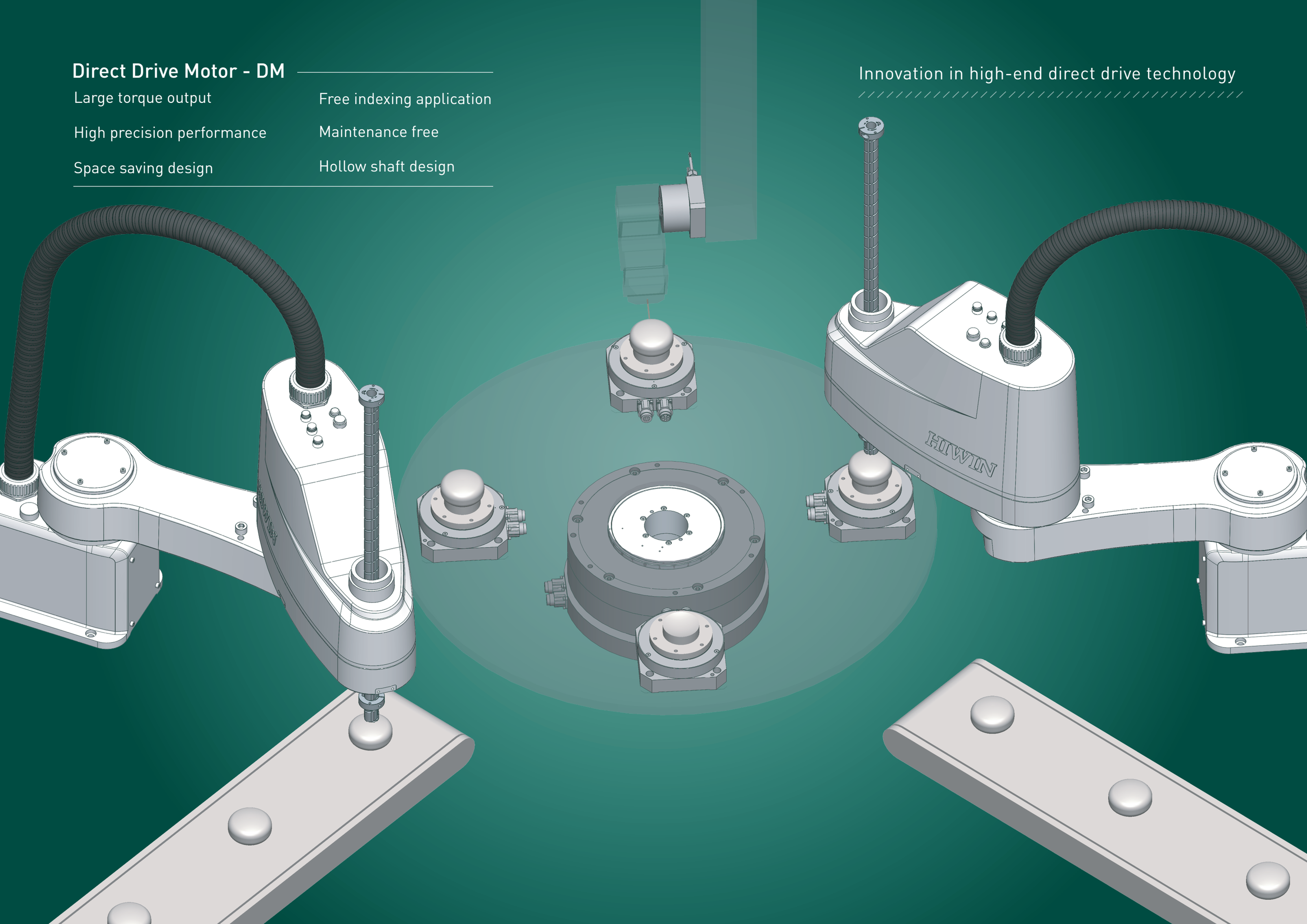
Series	External diameter (mm)	Hollow shaft diameter (mm)	Encoder type	Spec page	Dimensions page	Peak torque (Nm)																					
						0.96	1.92	4.2	8.4	9	12	18	24	30	40	45	60	75	100	110	120	141	150	165	180	225	282	300	450
DMN	230	50	Incremental	P.25	P.26																	DMN95-5 (H:95)					DMN9A-5 (H:155)		
	230	50	Absolute	P.24	P.26																	DMN95-C/E (H:95)					DMN9A-C/E (H:155)		
DMS	110	24	Incremental	P.30	P.31					DMS03-4 (H:117.5)		DMS07-4 (H:150)																	
	150	35	Incremental	P.32	P.33							DMS12-5 (H:100)		DMS14-5 (H:120)		DMS16-5 (H:140)	DMS18-5 (H:160)												
	200	60	Incremental	P.34	P.35												DMS34-5 (H:150)				DMS38-5 (H:190)				DMS3C-5 (H:230)				
	300	104	Incremental	P.36	P.37																		DMS74-6 (H:160)			DMS76-6 (H:180)			DMS7C-6 (H:240)
	110	24	Absolute	P.30	P.31					DMS03-E (H:117.5)		DMS07-E (H:150)																	
	150	35	Absolute	P.32	P.33							DMS12-E (H:100)		DMS14-E (H:120)		DMS16-E (H:140)	DMS18-E (H:160)												
	200	60	Absolute	P.34	P.35												DMS34-E (H:150)				DMS38-E (H:190)				DMS3C-E (H:230)				
	300	104	Absolute	P.36	P.37																		DMS74-E (H:160)			DMS76-E (H:180)			DMS7C-E (H:240)
DMT	290	140	Incremental	P.41	P.42									DMTB2-7 (H:22)															
	390	240	Incremental	P.41	P.42												DMTF2-8 (H:22)												
	520	340	Incremental	P.41	P.42															DMTK3-9 (H:30)									
	290	140	Absolute	P.41	P.42									DMTB2-F (H:22)															
	390	240	Absolute	P.41	P.42												DMTF2-G (H:22)												
	520	340	Absolute	P.41	P.42															DMTK3-G (H:30)									
DMH	150	30	Incremental	P.45	P.46														DMH6B-4 (H:185)					DMH6G-4 (H:235)					
	150	30	Absolute	P.45	P.46														DMH6B-E (H:185)					DMH6G-E (H:235)					

HIWIN® MIKROSYSTEM

Direct Drive Motor - DM

- Large torque output
- High precision performance
- Space saving design
- Free indexing application
- Maintenance free
- Hollow shaft design

Innovation in high-end direct drive technology



Direct Drive Motor - DM

Product Introduction and Application

HIWIN direct drive motors use direct drive design so reducers are not required. There is a highly rigid connection between the motor and load. Working with a servo drive, the motor can operate with outstanding acceleration and motion stability. HIWIN direct drive motors are especially suitable for tasks in automation because of the hollow shaft design. Cable systems and mechanical parts can be fed through without problems.

- No backlash
- Hollow shaft
- Maintenance free
- Compact and ultra-thin options available
- Brush-free drive
- Extremely rigid support with cross-roller bearing
- IP 65 available
- Integrated clamp is available as an option
- Absolute optical encoder is available as an option
- Hall sensor is available as an option

Applications

Classification	Application	Priority Performance Requirements					
		Accuracy	Speed	Rigidity	Compactness	Cleanliness	Maintenance Free
Production equipment	CVD, Wafer cleaning, ion Implantation	o			o	o	o
	Semi-conductor transport, Inspection/Processing	o			o	o	o
Assembly machines	Assembly machines for electric components	o	o		o	o	o
	High-speed assembly machines for electronic components	o	o		o	o	o
	Various assembly machines	o	o		o	o	o
Inspection / testing equipment	Machine part inspection	o			o		o
	Inspection of electric components	o			o		o
	Inspection of optical components	o			o		o
	Chemical analysis of liquids		o			o	o
	Various Inspection / testing equipment	o			o		o
Robots	Various assembly robots	o	o	o	o		o
	Various transport robots	o	o		o		o
	Inspection/Transport robots in clean rooms	o	o		o	o	o

Contents

Outer rotating series

DMY Series

The best solution to upgrade mechanical transmission to direct drive design

- Outer rotating structure
- Integrated high resolution incremental/absolute feedback system
- High dynamic, torque and precision
- Maximum torque: 12 ~ 300 Nm
- Compatible with special environments

Application

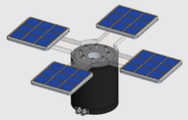
Laser machining and general industrial machinery.

Glass substrate wire cutting and inspection

For large workpieces, the outer-rotating structure optimizes inertia.

Laser machining, test and sorting

High speed acceleration and deceleration with an outstanding motion profile.



Low center of gravity and low profile series

DMN Series

A low-profile model suitable for high precision micro processing

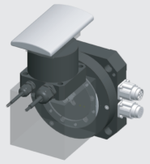
- Inner rotating structure
- Space saving design
- High resolution incremental or absolute encoder
- High dynamics, high torque and high precision accuracy

Application

Laser machining and conformal coating

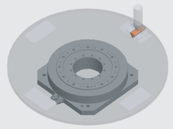
3C electronics and curved surface inspection

Space saving design, ideal for small-angle load adjustments.



3C electronics and coating

Increase productivity and reduce production cycle. Large movement with outstanding accuracy.



Inner rotating series

DMS Series

Suitable for high speed moving and high precision application

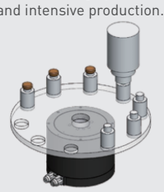
- Inner rotating structure
- High dynamic, torque and precision
- Maximum torque: 9.3 ~ 450 Nm
- Meets IP65 enclosure standards as an option
- Integrated clamp is available as an option
- Hall sensor is available as an option

Application

Laser machining and general industrial machinery.

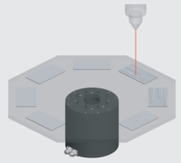
Small part assembly and inspection.

Multi-motion indexing function.
Suitable for highly efficient and intensive production.



Semiconductor/ 3C electronics and laser application

Index position
Accuracy <2.5 arc-sec
Axial runout < 5 μm



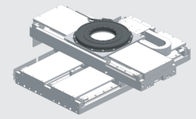
Suitable for high precision semiconductor manufacturing process

Low center of gravity and ultra-thin series

DMT Series

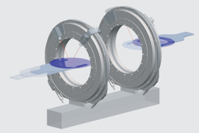
3C electronics and circuit printing

High-temperature endurance.
Hollow shaft>140 mm.



Semiconductor processing and laser application

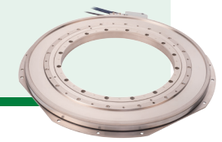
High precision moving platform.
Axial runout <5 μm



- Ultra-thin structure
- High resolution encoder
- No reduction mechanism needed
- Backlash-free
- Extremely rigid support with HIWIN cross-roller bearings
- Excellent positioning accuracy
- Low speed ripple

Application

AOI inspection and semiconductor processing.



Suitable for IC packaging and inspection

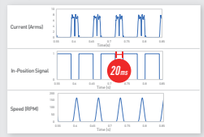
Low inertia and high response

DMH Series

Application for turret structure

High manufacturing Efficiency
Lightly payload

The chart of 22.5 moving degree, moving time :20 ms



Applications

- Specification: DMH6G-40
- Load inertia: 0.0207 kgm²
- Moving angle: 22.5°
- Moving time: 20 ms
- Cycle time: 60 ms
- Production capacity: 60 K Unit Per Hour

The below graph for specified application simplify, this motor suitable widely applied

- High response dynamic
- Low rotor inertia construction
- High speed index operation

Application

Appearance inspection equipment, IC test handler

DMY Series

The DMY series is designed with an integrated, high resolution feedback system which is optimized to achieve high dynamic motion, high torque and high precision. The DMY series is ideal for industries that require high precision with high torque demand.

- Outer rotating structure
- Integrated high resolution incremental/absolute feedback system
- High dynamic, torque and precision
- Maximum torque: 12 ~ 300 Nm

Model Numbers for DMY Series

Motor Specification									Mechanical Specification									
DMY	6	3	-	5	0	S	P	0	0	-	S	0	-	0	A	S	-	0	-	1

Model

Encoder
C, E: Absolute
5: Analog incremental
R, S: Digital incremental

Hall Sensor
0: Without hall sensor (Standard)
1: With hall sensor

Winding Code
S: Standard

Temperature Sensor
N: Without temperature sensor
P: With PTC sensor (Standard)

International Protection Standard
0: IP40 (Standard)
1: IP65

Function Code

Reserved code

Clamp
Without clamp: 0 (Standard)
With power-on clamp: 1
With power-off clamp: 2
With power-off clamp: 4 (backlash-free)

Mechanical Interface
Standard: S
(According to the drawing)

Connector Type
Absolute, digital incremental standard: S (AMP joint)
Analog incremental standard: A (M17 metallic joint)

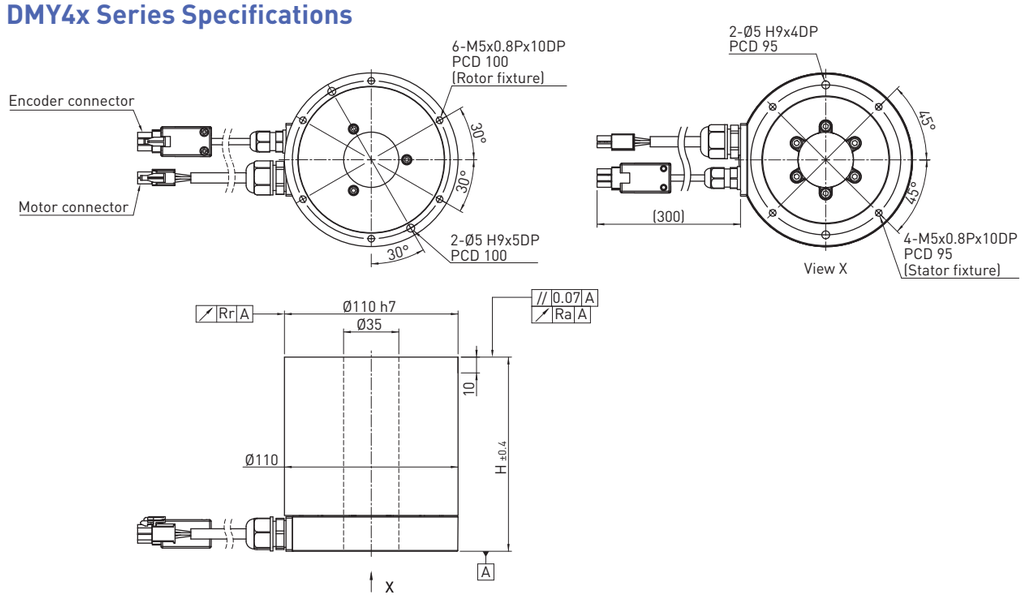
Wire Length
No cable (Analog incremental standard): 0
0.3 m (Absolute, digital incremental standard): 1

Accuracy Compensation
Without compensation (Standard): 0
±10 arc-sec: 1
±5 arc-sec: 4

Axial/Radial Runout (Measuring with jig)
30 μm/30 μm (Standard): S
5 μm/30 μm: P
5 μm/15 μm: A
5 μm/30 μm (5 μm): E
5 μm/15 μm (5 μm): F

*The product should avoid environment with corrosive gas, cutting oil and metal powder.
*This catalogue only demonstrates absolute encoders. As to incremental encoders, the resolution and connector
type may be different. Please consult your local distributor or HIWIN MIKROSYSTEM.

DMY4x Series Specifications



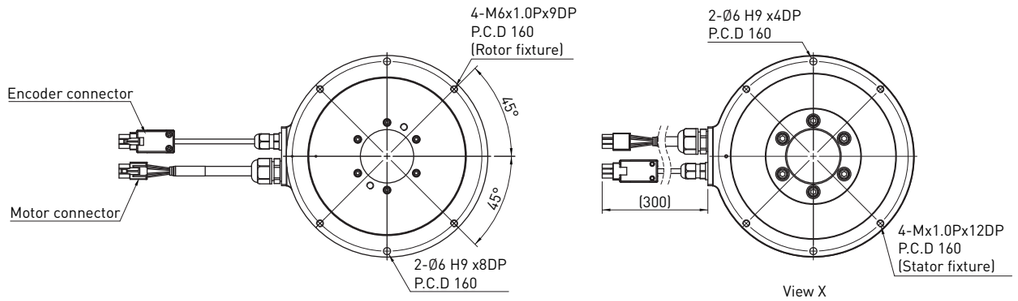
DMY4x Series Specifications

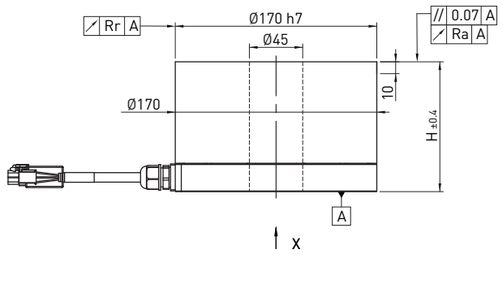
	Symbol	Unit	DMY44-□0SP00	DMY48-□0SP00
Motor power	-	W	167	335
Continuous torque	T_c	Nm	4	8
Continuous current	I_c	A_{rms}	2.6	2.6
Peak torque (Within 1s.)	T_p	Nm	12	24
Peak current (Within 1s.)	I_p	A_{rms}	7.8	7.8
Torque constant	K_t	Nm/A_{rms}	1.56	3.12
Electrical time constant	T_e	ms	5.2	5.4
Resistance (line to line at 25°C)	R_{25}	Ω	2.57	4.5
Inductance (line to line)	L	mH	13.27	24.42
Number of poles	2_p	-	14	14
Back emf constant (line to line)	K_v	Vrms/(rad/s)	0.9	1.8
Motor constant (line to line at 25°C)	K_m	$Nm/\sqrt{W}$	0.8	1.2
Thermal resistance	R_{th}	K/W	2.9	1.6
Temperature sensor	-	-	PTC100	
Max.DC Bus	-	V_{DC}	500(600[2])	
Inertia of rotating parts	J	kgm^2	0.0065	0.0085
Mass of motor	M_m	kg	5	7.5
Max. axial load	F_a	N	1000	1000
Max. moment load	M	Nm	30	30
Max. speed	-	RPM	400	400
Absolute resolution	□	bit	C: 21[4]	
			E: 23[4]	
Repeatability[6]	-	arc-sec	±2.5	
Accuracy[6]	-	arc-sec	±25/±10[1]/±5[1]	
Axial runout	R_a	mm	0.03(0.005[2])	
Radial runout	R_r	mm	0.03(0.015[2])(<0.005>[3])	
Height	H	mm	123	163

Note: [1]After error mapping
[2]Optional
[3]Optional, The value measurement need with jig.Refer to P.57 for details.
[4]ABS encoder only work with E2 drive.
[5]The encoder output is 1Vpp. For digital TTL output, please contact HIWIN MIKROSYSTEM.
[6]If you have other needs, please consult your local distributor or HIWIN MIKROSYSTEM.
*All the specifications in the table are in ±10% of tolerance except dimensions.

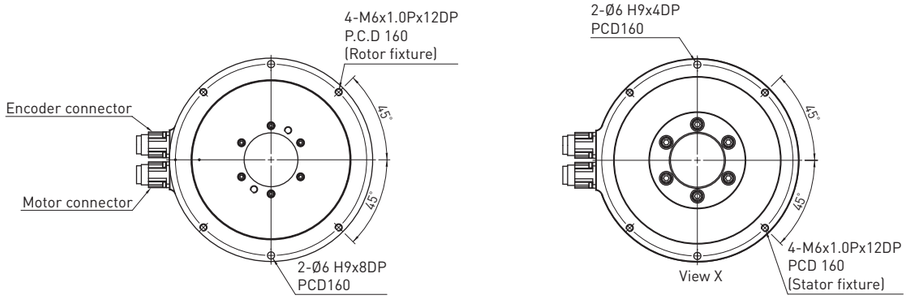
DMY6x Series Specifications

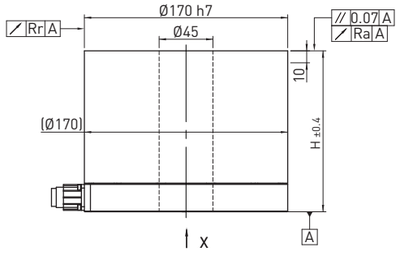
■ DMY6x ABS Series Dimensions And Connectors





■ DMY6x INC Series Dimensions And Connectors





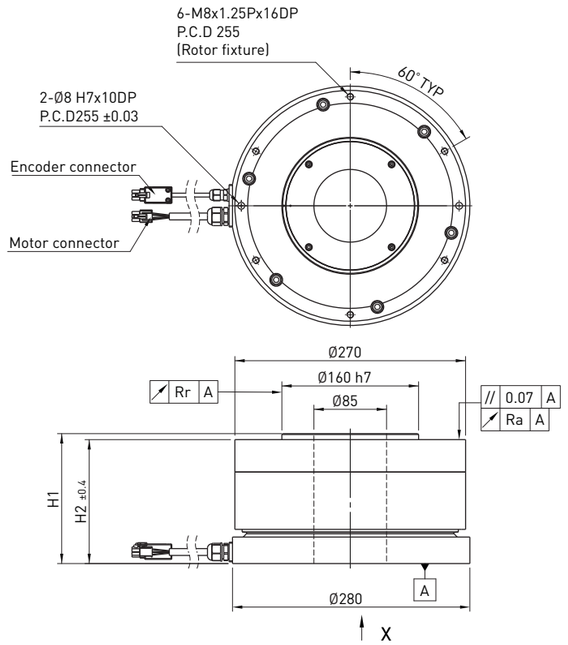
DMY6x Series Specifications

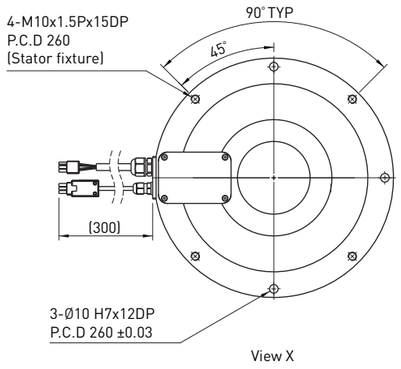
	Symbol	Unit	DMY63-□0SP00	DMY65-□0SP00	DMY68-□0SP00
Motor power	-	W	418	837	1005
Continuous torque	T_c	Nm	8	16	24
Continuous current	I_c	A_{rms}	3.8	3.8	3.8
Peak torque (Within 1s.)	T_p	Nm	24	48	72
Peak current (Within 1s.)	I_p	A_{rms}	12	12	12
Torque constant	K_t	Nm/A_{rms}	2.13	4.26	6.39
Electrical time constant	T_e	ms	5.7	6.8	6.5
Resistance (line to line at 25°C)	R_{25}	Ω	2	3.1	4.38
Inductance (line to line)	L	mH	11.4	21	28.26
Number of poles	2_p	-	16	16	16
Back emf constant (line to line)	K_v	V_{rms}/(rad/s)	1.2	2.5	3.7
Motor constant (line to line at 25°C)	K_m	$Nm/\sqrt{W}$	1.2	2	2.5
Thermal resistance	R_{th}	K/W	1.7	1.1	0.8
Temperature sensor	-	-	PTC 100		
Max.DC Bus	-	V_{DC}	500(600[2])		
Inertia of rotating parts	J	kgm^2	0.019	0.026	0.033
Mass of motor	M_m	kg	7.7	10.7	14.7
Max. axial load	F_a	N	3700	3700	3700
Max. moment load	M	Nm	60	60	60
Max. speed	-	RPM	500	500	400
Encoder line count[5]	-	line/rev	3600		
Absolute resolution	□	bit	C: 21[4]		
			E: 23[4]		
Incremental resolution		p/rev	5: 4,320,000		
Repeatability[6]	-	arc-sec	±2.5		
Accuracy[6]	-	arc-sec	±15/±10[1]/±5[1]		
Axial runout	R_a	mm	0.03(0.005[2])		
Radial runout	R_r	mm	0.03(0.015[2])(<0.005>[3])		
Height	H	mm	109.5	134.5	159.5

Note: [1]After error mapping
[2]Optional
[3]Optional, The value measurement need with jig. Refer to P.57 for details.
[4]ABS encoder only work with E2 drive.
[5]The encoder output is 1Vpp. For digital TTL output, please contact HIWIN MIKROSYSTEM.
[6]If you have other needs, please consult your local distributor or HIWIN MIKROSYSTEM.
*All the specifications in the table are in ±10% of tolerance except dimensions.

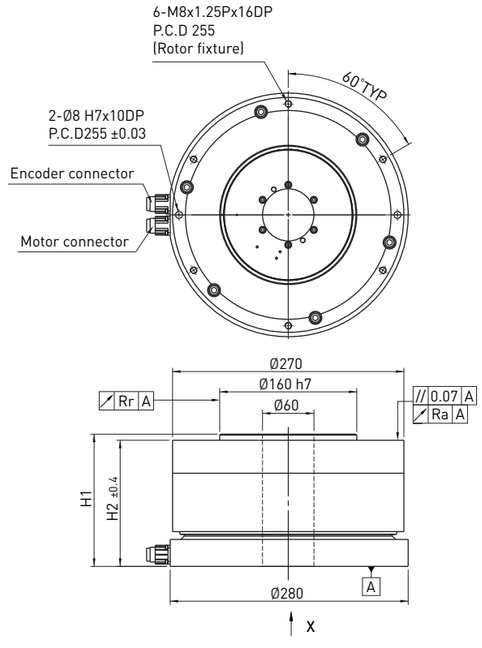
DMYAx Series Specifications

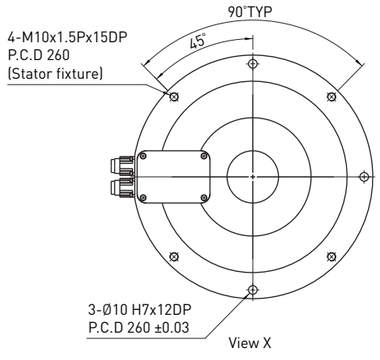
DMYAx ABS Series Dimensions And Connectors





DMYAx INC Series Dimensions And Connectors





DMYAx Series Specifications

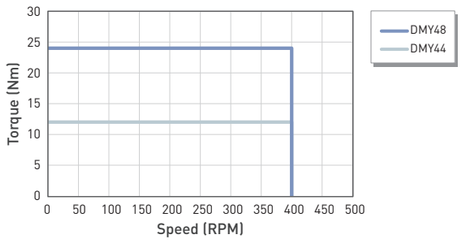
	Symbol	Unit	DMYA3-□0SP00	DMYA5-□0SP00	DMYAA-□0SP00
Motor power	-	W	523	523	1047
Continuous torque	T_c	Nm	25	50	100
Continuous current	I_c	A_{rms}	2.2	2.2	4.4
Peak torque (Within 1s.)	T_p	Nm	75	150	300
Peak current (Within 1s.)	I_p	A_{rms}	6.6	6.6	13.2
Torque constant	K_t	Nm/A_{rms}	11.4	22.5	22.5
Electrical time constant	T_e	ms	11.3	12.8	13.3
Resistance (line to line at 25°C)	R_{25}	Ω	8.6	13.3	5.8
Inductance (line to line)	L	mH	97	170	77
Number of poles	2_p	-	22	22	22
Back emf constant (line to line)	K_v	$V_{rms}/(rad/s)$	6.6	13	13
Motor constant (line to line at 25°C)	K_m	$Nm/\sqrt{W}$	3.2	5	7.6
Thermal resistance	R_{th}	K/W	1.2	0.8	0.4
Temperature sensor	-	-	PTC100		
Max.DC Bus	-	V_{DC}	500(600[2])		
Inertia of rotating parts	J	kgm^2	0.254	0.32	0.44
Mass of motor	M_m	kg	45	54	71
Max. axial load	F_a	N	8000	8000	8000
Max. moment load	M	Nm	240	240	240
Max. speed	-	RPM	200	100	100
Encoder line count[5]	-	line/rev	3600		
Absolute resolution	□	bit	C: 21[4]		
			E: 23[4]		
Incremental resolution		p/rev	5: 4,320,000		
Repeatability[6]	-	arc-sec	±2.5		
Accuracy[6]	-	arc-sec	±15/±10[1]/±5[1]		
Axial runout	R_a	mm	0.03(0.005[2])		
Radial runout	R_r	mm	0.03(0.015[2]) (<0.005>[3])		
Height of Installation	H_2	mm	120	145	200
Height	H_1	mm	127	152	207

Note: [1]After error mapping
[2]Optional
[3]Optional, The value measurement need with jig. Refer to P.57 for details.
[4]ABS encoder only work with E2 drive.
[5]The encoder output is 1Vpp. For digital TTL output, please contact HIWIN MIKROSYSTEM.
[6]If you have other needs, please consult your local distributor or HIWIN MIKROSYSTEM.
*All the specifications in the table are in ±10% of tolerance except dimensions.

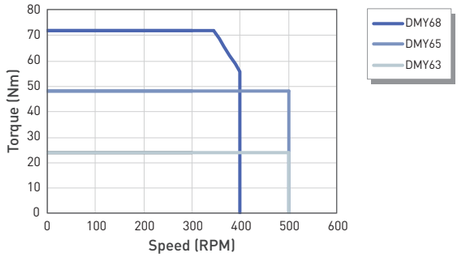
DMY Series T-N Curves

(DC bus voltage=325V_{DC})

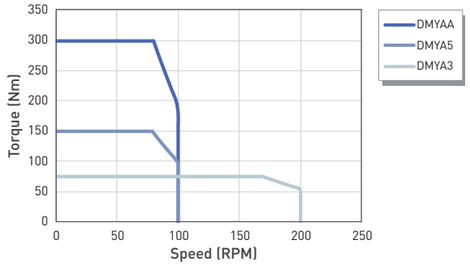
DMY4



DMY6



DMYA



DMN Series

The DMN series is designed with a low profile and high resolution incremental or absolute encoder optimized to achieve high dynamic motion, high torque and high precision. The DMN series is a perfect fit for industries that require high precision but less force.

- Light and thin platform
- Space saving with low profile design
- High resolution incremental or absolute encoder
- High dynamic, torque and precision

Model Numbers for DMN Series

Motor Specification									Mechanical Specification								
DMN	7	1	-	4	0	S	P	0	0	-	S	0	-	0	A	S	-	0	-	1

Model

Encoder
C, E: Absolute
2, 4, 5: Analog incremental
N, P, R, S: Digital incremental

Hall Sensor
0: Without hall sensor (Standard)
1: With hall sensor

Winding Code
S: Standard

Temperature Sensor
N: Without temperature sensor
P: With PTC sensor (Standard)

International Protection Standard
0: IP40 (Standard)
1: IP65

Function Code

Reserved code

Clamp
Without clamp: 0 (Standard)
With power-on clamp: 1
With power-off clamp: 2
With power-off clamp: 4 (backlash-free)

Mechanical Interface
Standard: S
(According to the drawing)

Connector Type
Absolute, digital incremental standard: S (AMP joint)
Absolute standard (only for DMN9A): J (AMP joint : Encoder) (M17 metallic joint : Motor)
Analog incremental standard: A (M17 metallic joint)

Wire Length
No cable (Analog incremental standard): 0
0.3 m (Absolute, digital incremental standard): 1
0.5 m (DMN21 INC encoder only): 2

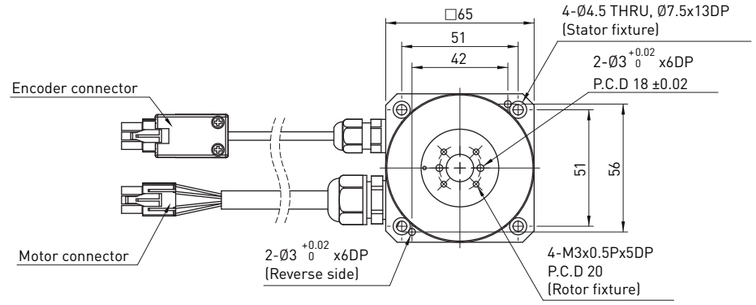
Accuracy Compensation
Without compensation (Standard): 0
±10 arc-sec: 1
±5 arc-sec: 4

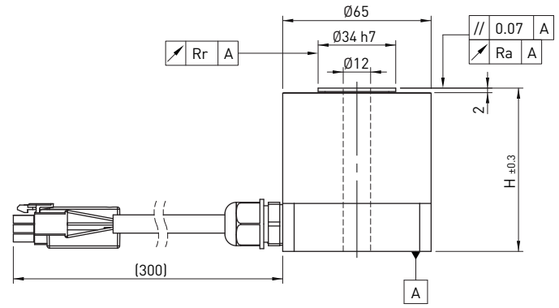
Axial/Radial Runout (Measuring with jig)
30 μm/30 μm (Standard): S
5 μm/30 μm: P
5 μm/15 μm: A
5 μm/30 μm (5 μm): E
5 μm/15 μm (5 μm): F

*The product should avoid environment with corrosive gas, cutting oil and metal powder.
*This catalogue only demonstrates absolute encoders. As to incremental encoders, the resolution and connector type may be different. Please consult your local distributor or HIWIN MIKROSYSTEM.

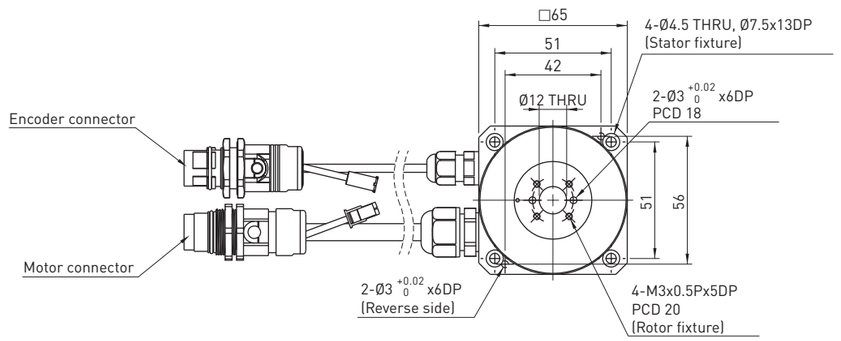
DMN2x, 4x Series Specifications

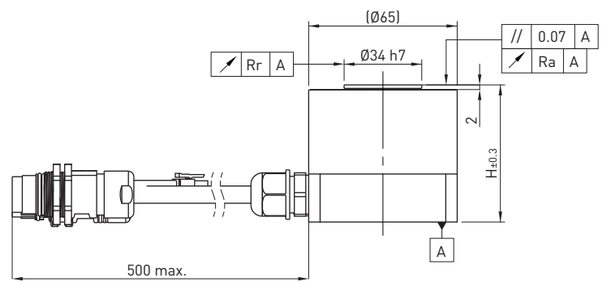
DMN2x ABS Series Dimensions And Connectors



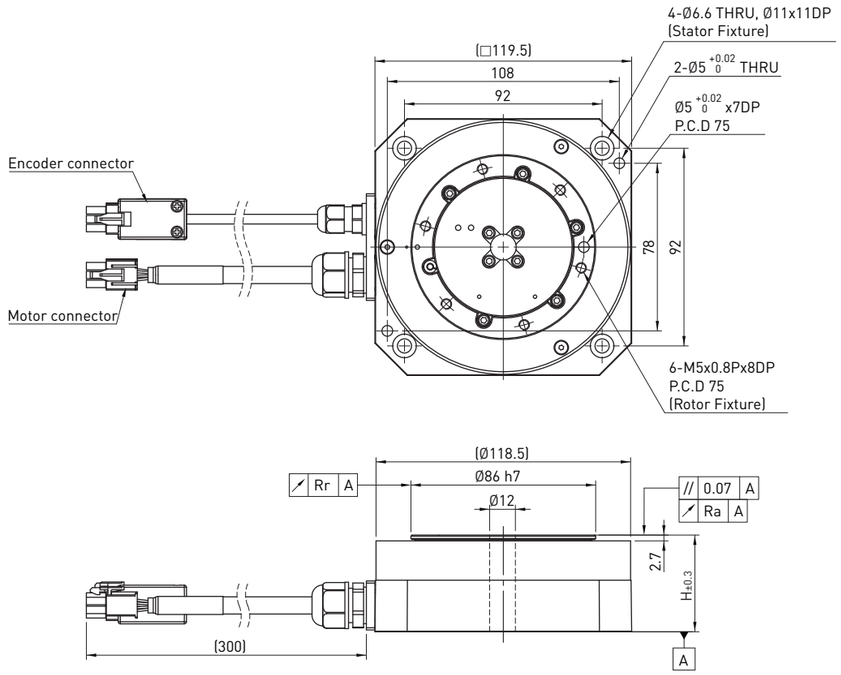


DMN2x INC Series Dimensions And Connectors

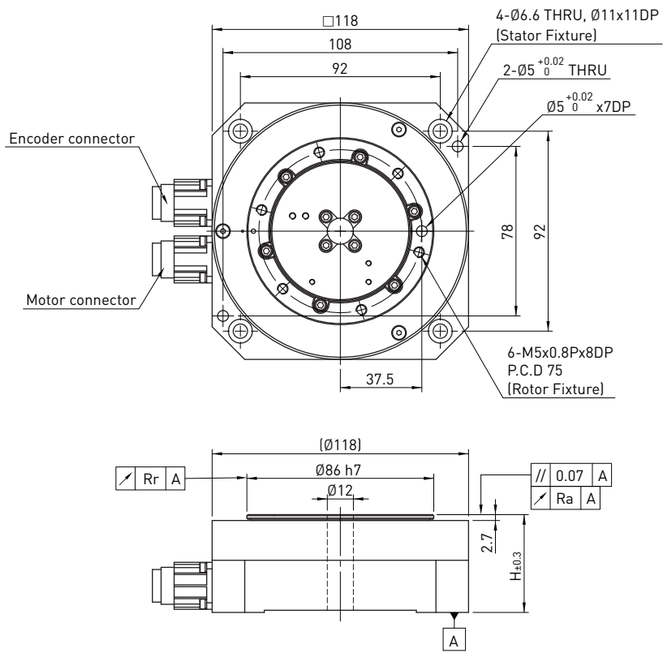




DMN4x ABS Series Dimensions And Connectors



DMN4x INC Series Dimensions And Connectors



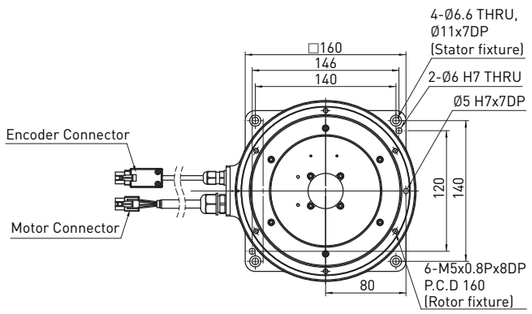
DMN2x, DMN4x Series Specifications

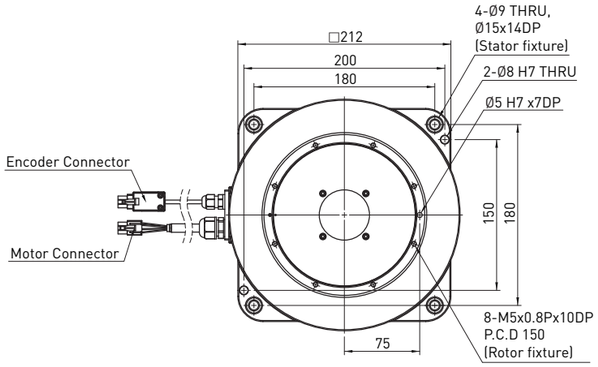
	Symbol	Unit	DMN21-□0SP00	DMN22-□0SP00	DMN42-□0SP00	DMN44-□0SP00
Motor power	-	W	50	100	102	205
Continuous torque	T_c	Nm	0.32	0.64	1.4	2.8
Continuous current	I_c	A_{rms}	1.9	1.9	1.5	1.5
Peak torque (Within 1s.)	T_p	Nm	0.96	1.92	4.2	8.4
Peak current (Within 1s.)	I_p	A_{rms}	5.7	5.7	4.5	4.5
Torque constant	K_t	Nm/A_{rms}	0.17	0.34	0.97	1.94
Electrical time constant	T_e	ms	3.3	4.1	1.8	2.1
Resistance (line to line at 25°C)	R_{25}	Ω	2.55	4.1	4.59	7.3
Inductance (line to line)	L	mH	8.4	16.7	8.18	15
Number of poles	2_p	-	10	10	16	16
Back emf constant (line to line)	K_v	V_{rms}/(rad/s)	0.1	0.2	0.56	1.12
Motor constant (line to line at 25°C)	K_m	$Nm/\sqrt{W}$	0.09	0.14	0.4	0.6
Thermal resistance	R_{th}	K/W	5.43	3.38	4.84	3.04
Temperature sensor	-	-	PTC100			
Max.DC Bus	-	V_{DC}	500(600[2])			
Inertia of rotating parts	J	kgm^2	0.000025	0.00003	0.0009	0.001
Mass of motor	M_m	kg	0.65	0.85	2	3
Max. axial load	F_a	N	100	100	600	600
Max. moment load	M	Nm	1.5	1.5	30	30
Max. speed	-	RPM	1500	1500	700	700
Encoder line count[5]	-	line/rev	1500			
Absolute resolution	□	bit	C: 21[4]			
			E: 23[4]			
Incremental resolution		p/rev	2:4,320,000			
Repeatability[6]	-	arc-sec	±2.5			
Accuracy[6]	-	arc-sec	±30/±10[1]/±5[1]			
Axial runout	R_a	mm	0.03(0.005[2])			
Radial runout	R_r	mm	0.03(0.015[2]) (<0.005>[3])			
Size	WxLxH	mm	65x65x60	65x65x71.5	118x118x45	118x118x65

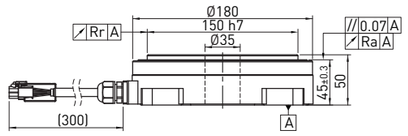
Note: [1]After error mapping
[2]Optional
[3]Optional, The value measurement need with jig. Refer to P.57 for details.
[4]ABS encoder only work with E2 drive.
[5]The encoder output is 1Vpp. For digital TTL output, please contact HIWIN MIKROSYSTEM.
[6]If you have other needs, please consult your local distributor or HIWIN MIKROSYSTEM.
*All the specifications in the table are in ±10% of tolerance except dimensions.

DMN71, DMN93 Specifications

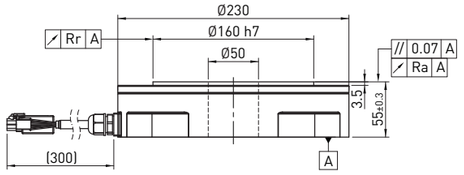
DMN71, DMN93 ABS Series Dimensions And Connectors





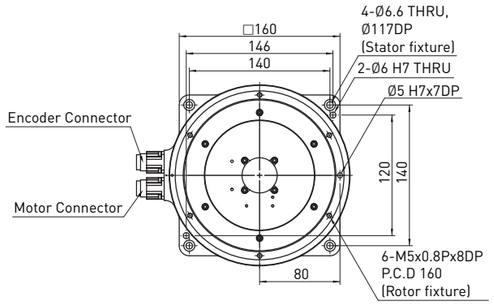


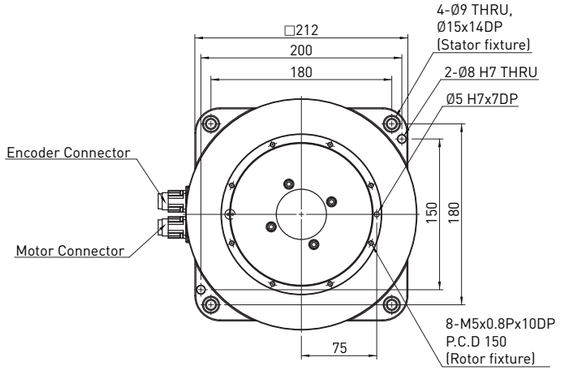
DMN71

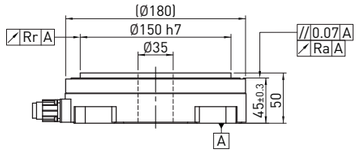


DMN93

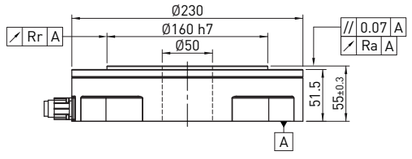
DMN71, DMN93 INC Series Dimensions And Connectors







DMN71



DMN93

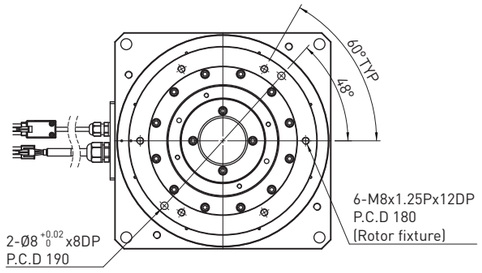
DMN71, DMN93 specifications

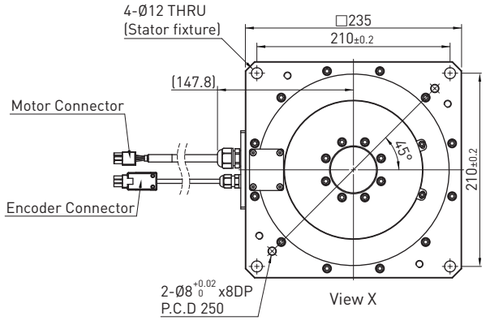
	Symbol	Unit	DMN71-□0SP00	DMN93-□0SP00
Motor power	-	W	232	691
Continuous torque	T_c	Nm	3.7	13.2
Continuous current	I_c	A_{rms}	3.4	3.4
Peak torque (Within 1s.)	T_p	Nm	11.1	39.6
Peak current (Within 1s.)	I_p	A_{rms}	10.2	10.2
Torque constant	K_t	Nm/A_{rms}	1.09	3.9
Electrical time constant	T_e	ms	3.5	5.4
Resistance (line to line at 25°C)	R_{25}	Ω	2.55	4.3
Inductance (line to line)	L	mH	9.02	23.2
Number of poles	2_p	-	16	22
Back emf constant (line to line)	K_v	$V_{rms}/(rad/s)$	0.63	2.25
Motor constant (line to line at 25°C)	K_m	$Nm/\sqrt{W}$	0.6	1.5
Thermal resistance	R_{th}	K/W	1.7	1.01
Temperature sensor	-	-	PTC 100	
Max.DC Bus	-	V_{DC}	500(600[2])	
Inertia of rotating parts	J	kgm^2	0.008	0.012
Mass of motor	M_m	kg	3.5	7.5
Max. axial load	F_a	N	1000	1000
Max. moment load	M	Nm	50	50
Max. speed	-	RPM	600	500
Encoder line count[5]	-	line/rev	2500	3600
Absolute resolution	□	bit	C: 21[4]	
			E: 23[4]	
Incremental resolution		p/rev	4:4,320,000	5:4,320,000
Repeatability[6]	-	arc-sec	±2.5	
Accuracy[6]	-	arc-sec	±25/±10[1]/±5[1]	±15/±10[1]/±5[1]
Axial runout	R_a	mm	0.03(0.005[2])	
Radial runout	R_r	mm	0.03(0.015[2])(<0.005>[3])	
Size	WxLxH	mm	160x160x50	212x212x55

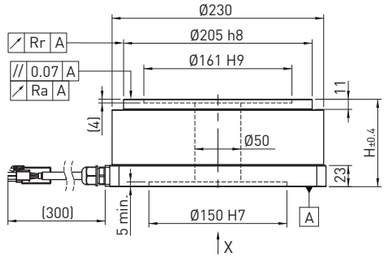
Note: [1]After error mapping
[2]Optional
[3]Optional, The value measurement need with jig. Refer to P.57 for details.
[4]ABS encoder only work with E2 drive.
[5]The encoder output is 1Vpp. For digital TTL output, please contact HIWIN MIKROSYSTEM.
[6]If you have other needs, please consult your local distributor or HIWIN MIKROSYSTEM.
*All the specifications in the table are in ±10% of tolerance except dimensions.

DMN95, DMN9A Specifications

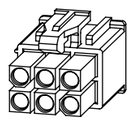
DMN95, DMN9A ABS Series Dimensions And Connectors







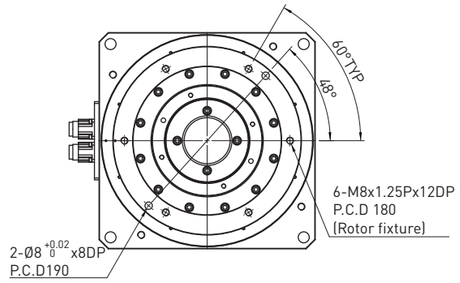
*Motor connector type

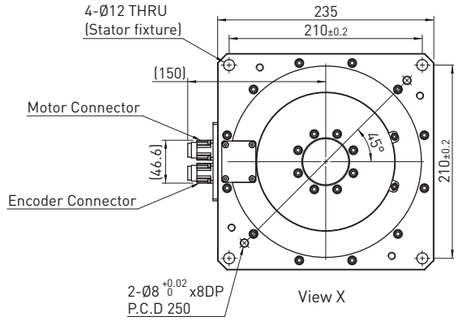


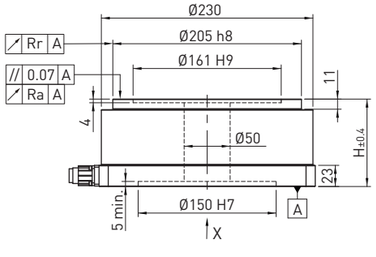
DMN95 series

DMN9A series

DMN95,DMN9A INC Series Dimensions And Connectors







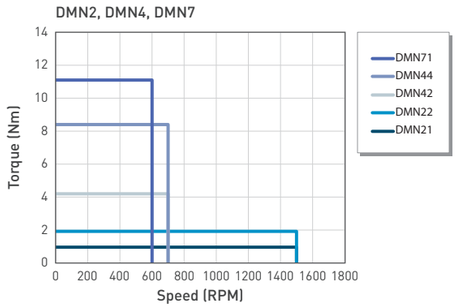
DMN95, DMN9A specifications

	Symbol	Unit	DMN95-□0SP00	DMN9A-□0SP00
Motor power	-	W	1230	3445
Continuous torque	T_c	Nm	47	94
Continuous current	I_c	A_{rms}	4	12
Peak torque (Within 1s.)	T_p	Nm	141	282
Peak current (Within 1s.)	I_p	A_{rms}	12	36
Torque constant	K_t	Nm/A_{rms}	11.76	7.6
Electrical time constant	T_e	ms	4.7	4.3
Resistance (line to line at 25°C)	R_{25}	Ω	6.01	1.06
Inductance (line to line)	L	mH	28	5.01
Number of poles	2_p	-	22	22
Back emf constant (line to line)	K_v	V_{rms}/(rad/s)	6.8	4.4
Motor constant (line to line at 25°C)	K_m	$Nm/\sqrt{W}$	3.9	6
Thermal resistance	R_{th}	K/W	0.52	0.33
Temperature sensor	-	-	PTC 100	
Max.DC Bus	-	V_{DC}	500(600[2])	
Inertia of rotating parts	J	kgm^2	0.042	0.042
Mass of motor	M_m	kg	22.5	31.5
Max. axial load	F_a	N	8000	8000
Max. moment load	M	Nm	120	120
Max. speed	-	RPM	250	350
Encoder line count[5]	-	line/rev	3600	
Absolute resolution	□	bit	C: 21[4]	
			E: 23[4]	
Incremental resolution		p/rev	5: 4,320,000	
Repeatability[6]	-	arc-sec	±2.5	
Accuracy[6]	-	arc-sec	±15/±10[1]/±5[1]	
Axial runout	R_a	mm	0.03(0.005[2])	
Radial runout	R_r	mm	0.03(0.015[2])(<0.005>[3])	
Size	WxLxH	mm	235x235x95	235x235x155

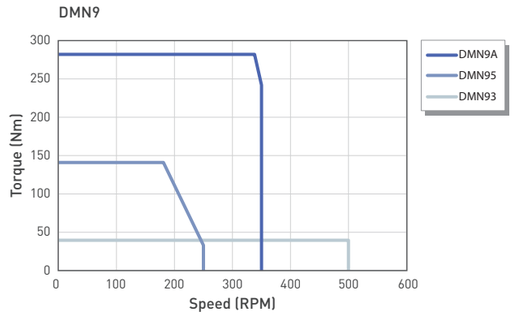
Note: [1]After error mapping
[2]Optional
[3]Optional, The value measurement need with jig. Refer to P.57 for details.
[4]ABS encoder only work with E2 drive.
[5]The encoder output is 1Vpp. For digital TTL output, please contact HIWIN MIKROSYSTEM.
[6]If you have other needs, please consult your local distributor or HIWIN MIKROSYSTEM.
*All the specifications in the table are in ±10% of tolerance except dimensions.

DMN Series T-N Curves

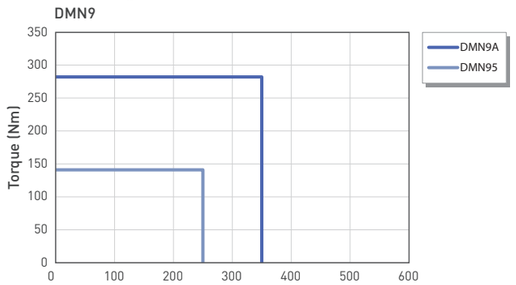
(DC bus voltage=325V_{DC})



(DC bus voltage=325V_{DC})



(DC bus voltage=600V_{DC})



DMS Series

The DMS series is designed with an integrated, high resolution feedback system optimized to achieve high dynamic motion, high torque and high precision. The DMS series is a perfect fit for industries that require high precision.

- Inner rotating structure
- Integrated incremental feedback system with resolution up to 4,320,000 p/rev
- High dynamic, torque and precision
- Maximum torque: 9.3~450 Nm
- Meets IP65 enclosure standards as an option
- Integrated clamp is available as an option
- Hall sensor is available as an option

Model Numbers for DMS Series

Motor Specification										Mechanical Specification										
DMS	3	4	-	5	0	S	P	0	0	-	S	0	-	0	A	S	-	0	-	1

Model

Encoder
E: Absolute
4, 5, 6: Analog incremental
P, R, T, U: Digital incremental

Hall Sensor
0: Without hall sensor (Standard)
1: With hall sensor

Winding Code
S: Standard
L: Low Back emf

Temperature Sensor
N: Without temperature sensor
P: With PTC sensor (Standard)

International Protection Standard
0: IP40 (Standard)
1: IP65

Function Code

Reserved code

Clamp
Without clamp: 0 (Standard)
With power-on clamp: 1
With power-off clamp: 2
With power-off clamp: 4 (backlash-free)

Mechanical Interface
Standard: S
(According to the drawing)

Connector Type
Absolute, digital incremental standard: S (AMP joint)
Analog incremental standard: A (M17 metallic joint)

Wire Length
No cable (Analog incremental standard): 0
0.3 m (Absolute, digital incremental standard): 1

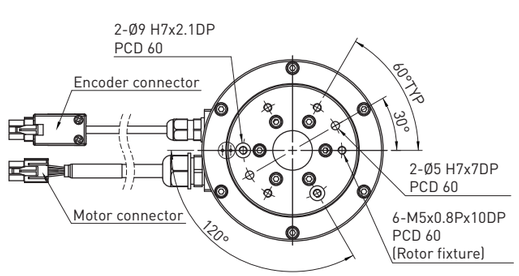
Accuracy Compensation
Without compensation (Standard): 0
±10 arc-sec: 1
±5 arc-sec: 4

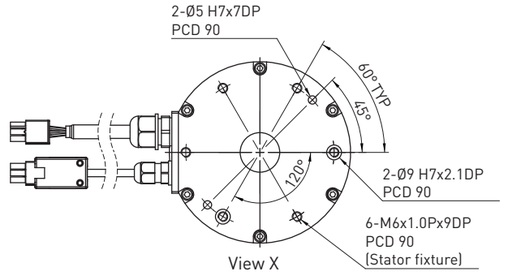
Axial/Radial Runout (Measuring with jig)
30 μm/30 μm (Standard): S
5 μm/30 μm: P
5 μm/15 μm: A
5 μm/30 μm (5 μm): E
5 μm/15 μm (5 μm): F

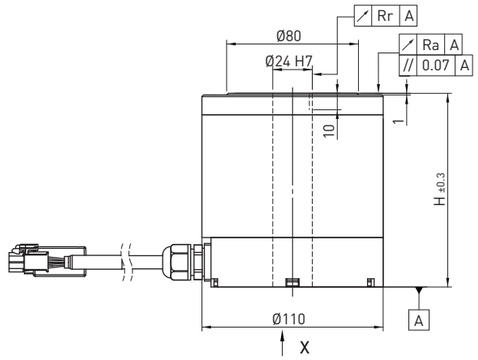
*The product should avoid environment with corrosive gas, cutting oil and metal powder.
*This catalogue only demonstrates absolute encoders. As to incremental encoders, the resolution and connector type may be different. Please consult your local distributor or HIWIN MIKROSYSTEM.

DMS0x Series Specifications

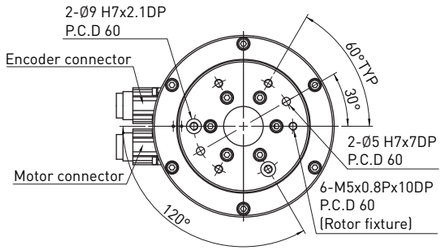
DMS0x ABS Series Dimensions And Connectors

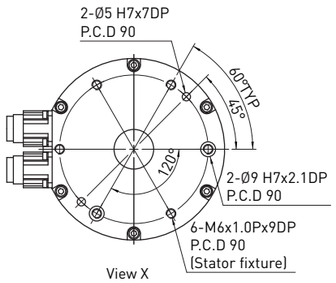


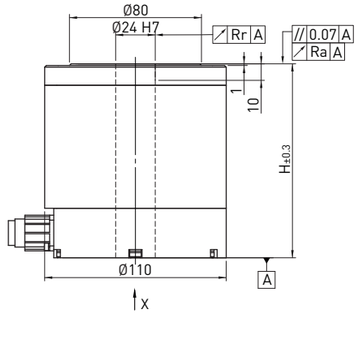




DMS0x INC Series Dimensions And Connector







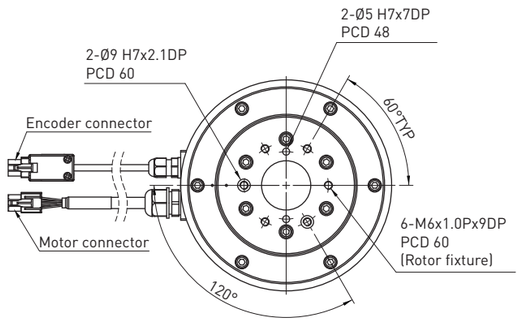
DMS0x Serie specifications

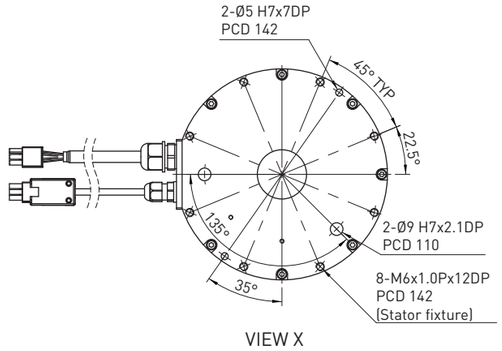
	Symbol	Unit	DMS03-□0SP00	DMS07-□0SP00
Motor power	-	W	227	454
Continuous torque	T_c	Nm	3.1	6.2
Continuous current	I_c	A_{rms}	2	2
Peak torque (Within 1s.)	T_p	Nm	9.3	18.6
Peak current (Within 1s.)	I_p	A_{rms}	6	6
Torque constant	K_t	Nm/A_{rms}	1.55	3.1
Electrical time constant	T_e	ms	1.9	2.1
Resistance (line to line at 25°C)	R_{25}	Ω	7.1	11.1
Inductance (line to line)	L	mH	13.8	23
Number of poles	2_p	-	10	10
Back emf constant (line to line)	K_v	$V_{rms}/(rad/s)$	0.82	1.7
Motor constant (line to line at 25°C)	K_m	$Nm/\sqrt{W}$	0.5	0.8
Thermal resistance	R_{th}	K/W	1.76	1.13
Temperature sensor	-	-	PTC 100	
Max.DC Bus	-	V_{DC}	500(600[2])	
Inertia of rotating parts	J	kgm^2	0.003	0.006
Mass of motor	M_m	kg	4	7
Max. axial load	F_a	N	3700	3700
Max. moment load	M	Nm	40	40
Max. speed	-	RPM	700	700
Encoder line count[5]	-	line/rev	2500	
Absolute resolution	□	bit	E: 23[4]	
Incremental resolution		p/rev	4: 4,320,000	
Repeatability[6]	-	arc-sec	±2.5	
Accuracy[6]	-	arc-sec	±25/±10[1]/±5[1]	
Axial runout	R_a	mm	0.03(0.005[2])	
Radial runout	R_r	mm	0.03(0.015[2])(<0.005>[3])	
Height	H	mm	117.5	150

Note: [1]After error mapping
[2]Optional
[3]Optional, The value measurement need with jig. Refer to P.57 for details.
[4]ABS encoder only work with E2 drive.
[5]The encoder output is 1Vpp. For digital TTL output, please contact HIWIN MIKROSYSTEM.
[6]If you have other needs, please consult your local distributor or HIWIN MIKROSYSTEM.
*All the specifications in the table are in ±10% of tolerance except dimensions.

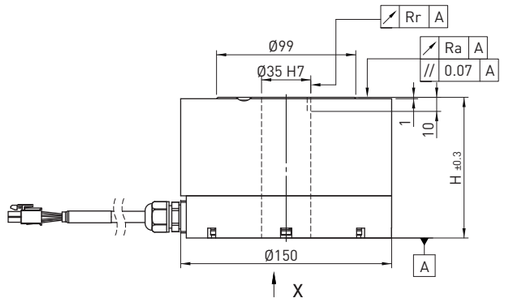
DMS1x Series Specifications

DMS1x ABS Series Dimensions And Connectors

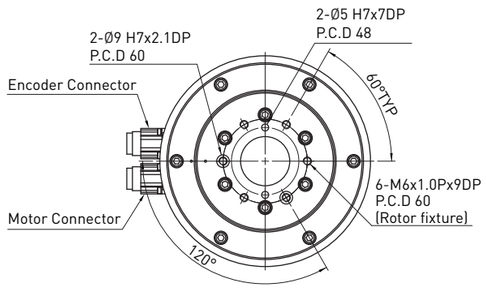


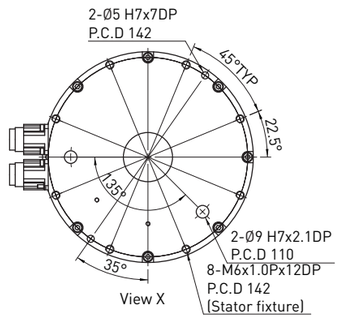


VIEW X

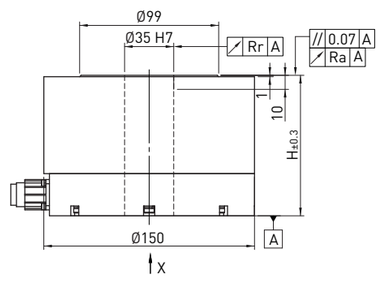


DMS1x INC Series Dimensions And Connectors





View X



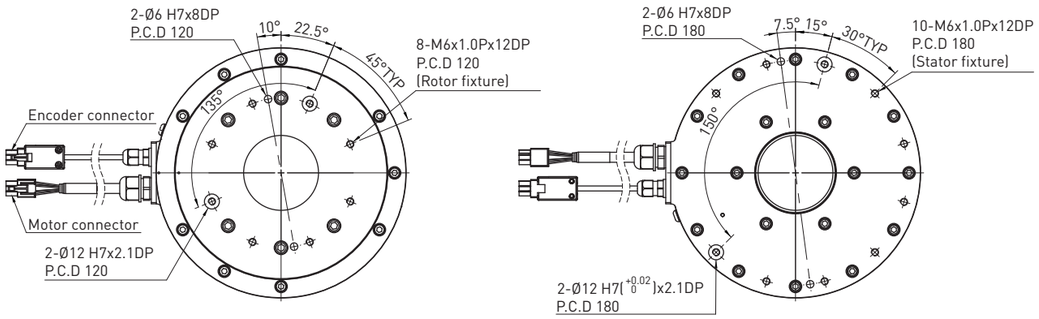
DMS1x Serie specifications

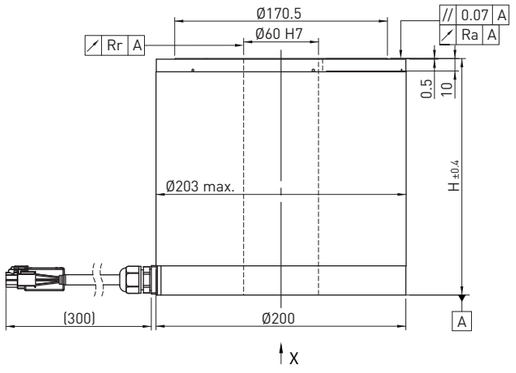
	Symbol	Unit	DMS12-□0SP00	DMS14-□0SP00	DMS16-□0SP00	DMS18-□0SP00
Motor power	-	W	314	628	942	1047
Continuous torque	T_c	Nm	5	10	15	20
Continuous current	I_c	A_{rms}	4	4	4	4
Peak torque (Within 1s.)	T_p	Nm	15	30	45	60
Peak current (Within 1s.)	I_p	A_{rms}	12	12	12	12
Torque constant	K_t	Nm/A_{rms}	1.25	2.5	3.75	5
Electrical time constant	T_e	ms	3.2	3.6	3.8	4
Resistance (line to line at 25°C)	R_{25}	Ω	2.6	3.9	5.2	6.5
Inductance (line to line)	L	mH	8.2	14	20	26
Number of poles	2_p	-	22	22	22	22
Back emf constant (line to line)	K_v	V_{rms}/(rad/s)	0.6	1.2	1.8	2.4
Motor constant (line to line at 25°C)	K_m	$Nm/\sqrt{W}$	0.6	1	1.3	1.6
Thermal resistance	R_{th}	K/W	1.2	0.8	0.6	0.48
Temperature sensor	-	-	PTC 100			
Max.DC Bus	-	V_{DC}	500(600[2])			
Inertia of rotating parts	J	kgm^2	0.006	0.0065	0.007	0.0075
Mass of motor	M_m	kg	5.7	7	8.3	9.5
Max. axial load	F_a	N	3700	3700	3700	3700
Max. moment load	M	Nm	60	60	60	60
Max. speed	-	RPM	600	600	600	500
Encoder line count[5]	-	line/rev	3600			
Absolute resolution	□	bit	E: 23[4]			
Incremental resolution		p/rev	5: 4,320,000			
Repeatability[6]	-	arc-sec	±2.5			
Accuracy[6]	-	arc-sec	±15/±10[1]/±5[1]			
Axial runout	R_a	mm	0.03(0.005[2])			
Radial runout	R_r	mm	0.03(0.015[2])(<0.005>[3])			
Height	H	mm	100	120	140	160

Note: [1]After error mapping
[2]Optional
[3]Optional, The value measurement need with jig. Refer to P.57 for details.
[4]ABS encoder only work with E2 drive.
[5]The encoder output is 1Vpp. For digital TTL output, please contact HIWIN MIKROSYSTEM.
[6]If you have other needs, please consult your local distributor or HIWIN MIKROSYSTEM.
*All the specifications in the table are in ±10% of tolerance except dimensions.

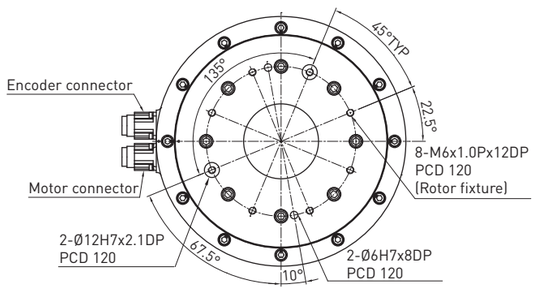
DMS3x Series Specifications

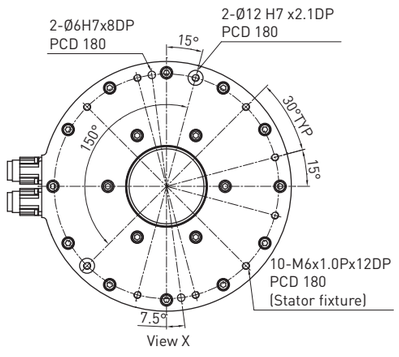
DMS3x ABS Series Dimensions And Connectors

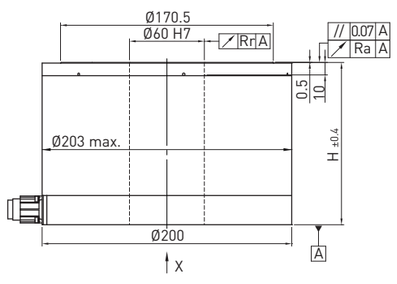




DMS3x INC Series Dimensions And Connectors







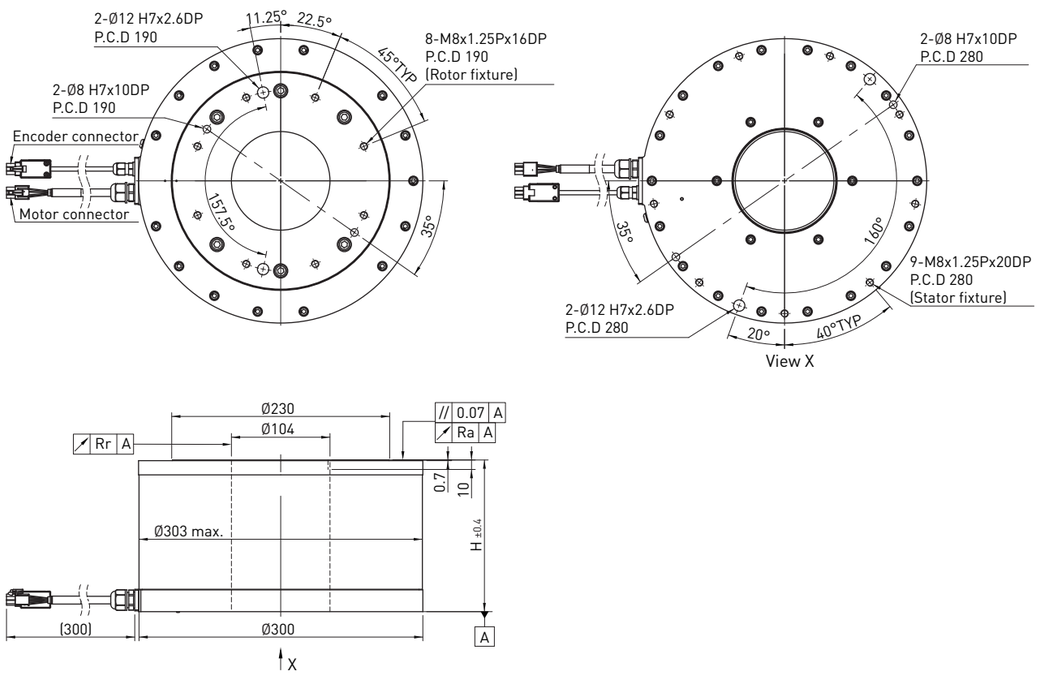
DMS3x Serie specifications

	Symbol	Unit	DMS34-□0SP00	DMS34-□0LP00	DMS38-□0SP00	DMS38-□0LP00	DMS3C-□0SP00	DMS3C-□0LP00
Motor power	-	W	837	1256	837	1884	753	1884
Continuous torque	T_c	Nm	20	20	40	40	60	60
Continuous current	I_c	A_{rms}	3	6	3	6	3	6
Peak torque (Within 1s.)	T_p	Nm	60	60	120	120	180	180
Peak current (Within 1s.)	I_p	A_{rms}	9	18	9	18	9	18
Torque constant	K_t	Nm/A_{rms}	6.6	3.3	13.3	6.65	20	10
Electrical time constant	T_e	ms	4.8	4.4	5.3	4.5	5.4	5
Resistance (line to line at 25°C)	R_{25}	Ω	8.4	1.7	13.6	2.9	18.8	3.9
Inductance (line to line)	L	mH	40	7.5	71.5	13	101	19.5
Number of poles	2_p	-	22	22	22	22	22	22
Back emf constant (line to line)	K_v	V_{rms}/(rad/s)	3.2	1.6	6.4	3.2	9.6	4.8
Motor constant (line to line at 25°C)	K_m	$Nm/\sqrt{W}$	1.9	2.1	2.9	3.2	3.8	4.1
Thermal resistance	R_{th}	K/W	0.66	0.82	0.41	0.48	0.3	0.36
Temperature sensor	-	-	PTC 100					
Max.DC Bus	-	V_{DC}	500(600[2])					
Inertia of rotating parts	J	kgm^2	0.02	0.02	0.026	0.026	0.035	0.035
Mass of motor	M_m	kg	17	17	22.5	22.5	28.5	28.5
Max. axial load	F_a	N	8000	8000	8000	8000	8000	8000
Max. moment load	M	Nm	240	240	240	240	240	240
Max. speed	-	RPM	400	600	200	450	120	300
Encoder line count[5]	-	line/rev	3600					
Absolute resolution	□	bit	E: 23[4]					
Incremental resolution		p/rev	5: 4,320,000					
Repeatability[6]	-	arc-sec	±2.5					
Accuracy[6]	-	arc-sec	±15/±10[1]/±5[1]					
Axial runout	R_a	mm	0.03(0.005[2])					
Radial runout	R_r	mm	0.03(0.015[2])(<0.005>[3])					
Height	H	mm	150	150	190	190	230	230

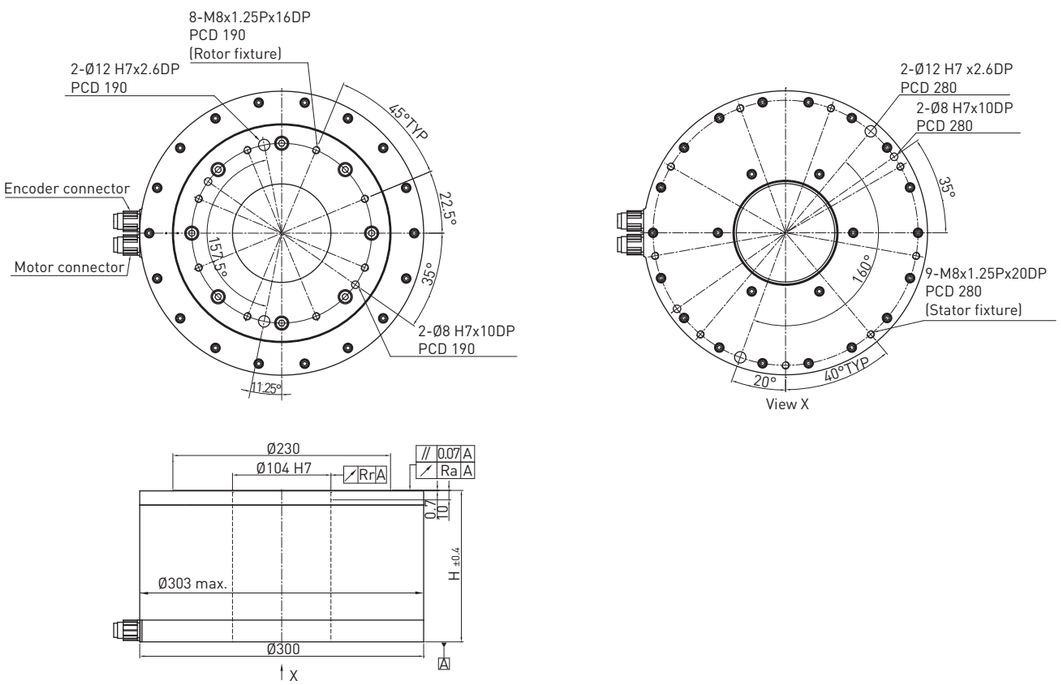
Note: [1]After error mapping
[2]Optional
[3]Optional, The value measurement need with jig. Refer to P.57 for details.
[4]ABS encoder only work with E2 drive.
[5]The encoder output is 1Vpp. For digital TTL output, please contact HIWIN MIKROSYSTEM.
[6]If you have other needs, please consult your local distributor or HIWIN MIKROSYSTEM.
*All the specifications in the table are in ±10% of tolerance except dimensions.

DMS7x Series Specifications

DMS7x ABS Series Dimensions And Connectors



DMS7x INC Series Dimensions And Connectors



DMS7x Serie specifications

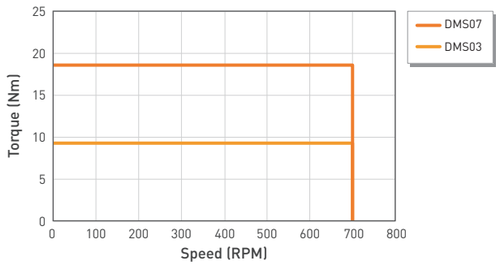
	Symbol	Unit	DMS74-□0SP00	DMS74-□0LP00	DMS76-□0SP00	DMS76-□0LP00	DMS7C-□0SP00	DMS7C-□0LP00
Motor power	-	W	628	1308	565	1334	376	1256
Continuous torque	T_c	Nm	50	50	75	75	150	150
Continuous current	I_c	A_{rms}	3	6	3	6	3	6
Peak torque (Within 1s.)	T_p	Nm	150	150	225	225	450	450
Peak current (Within 1s.)	I_p	A_{rms}	9	18	9	18	9	18
Torque constant	K_t	Nm/A_{rms}	16.7	8.35	25	12.5	50	25
Electrical time constant	T_e	ms	4.7	5	5.1	5.6	5.4	6
Resistance (line to line at 25°C)	R_{25}	Ω	14	3.5	19	4.8	32.5	8.5
Inductance (line to line)	L	mH	66.5	17.5	96.5	27	176	50.6
Number of poles	2_p	-	44	44	44	44	44	44
Back emf constant (line to line)	K_v	V_{rms}/(rad/s)	10.8	5.4	16.2	8.1	32.4	16.2
Motor constant (line to line at 25°C)	K_m	$Nm/\sqrt{W}$	3.6	3.6	4.7	4.7	7.2	7.0
Thermal resistance	R_{th}	K/W	0.4	0.4	0.29	0.29	0.17	0.16
Temperature sensor	-	-	PTC 100					
Max.DC Bus	-	V_{DC}	500(600[2])					
Inertia of rotating parts	J	kgm^2	0.152	0.152	0.174	0.174	0.241	0.241
Mass of motor	M_m	kg	36	36	41	41	57	57
Max. axial load	F_a	N	8000	8000	8000	8000	8000	8000
Max. moment load	M	Nm	360	360	360	360	360	360
Max. speed	-	RPM	120	250	72	170	24	80
Encoder line count[5]	-	line/rev	5400					
Absolute resolution	□	bit	E: 23[4]					
Incremental resolution		p/rev	6: 4,320,000					
Repeatability[6]	-	arc-sec	±2.5					
Accuracy[6]	-	arc-sec	±15/±10[1]/±5[1]					
Axial runout	R_a	mm	0.03(0.005[2])					
Radial runout	R_r	mm	0.03(0.015[2])(<0.005>[3])					
Height	H	mm	160	160	180	180	240	240

Note: [1]After error mapping
[2]Optional
[3]Optional, The value measurement need with jig. Refer to P.57 for details.
[4]ABS encoder only work with E2 drive.
[5]The encoder output is 1Vpp. For digital TTL output, please contact HIWIN MIKROSYSTEM.
[6]If you have other needs, please consult your local distributor or HIWIN MIKROSYSTEM.
*All the specifications in the table are in ±10% of tolerance except dimensions.

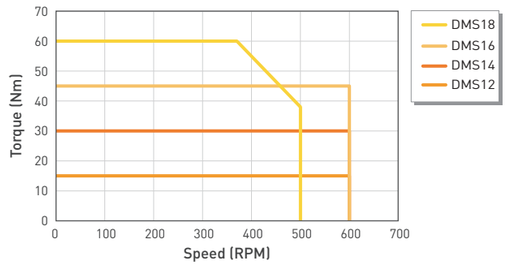
DMS Series T-N Curves

(DC bus voltage=325VDC)

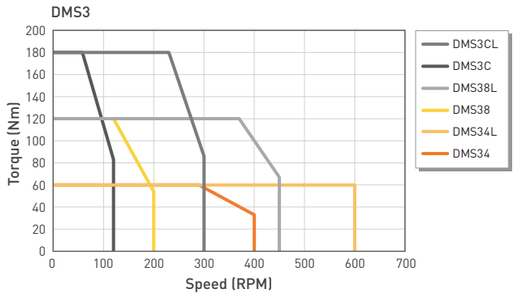
DMS0



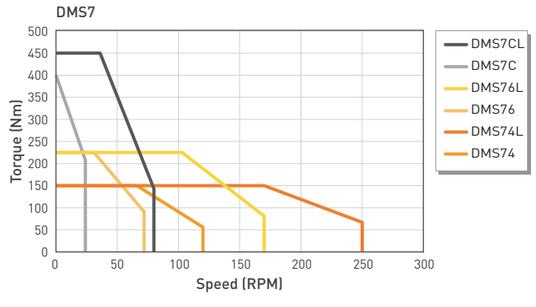
DMS1



DMS3

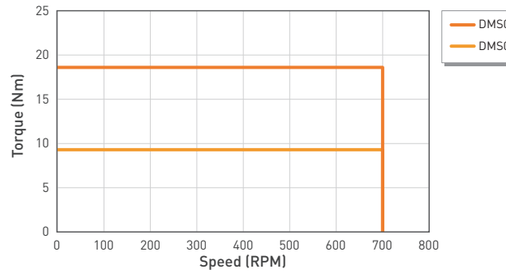


DMS7

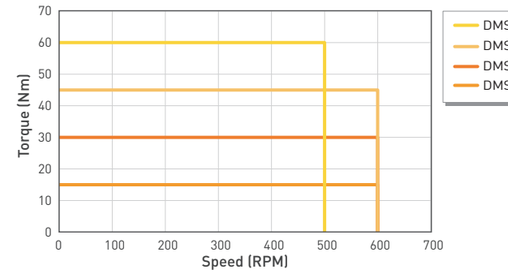


(DC bus voltage=600VDC)

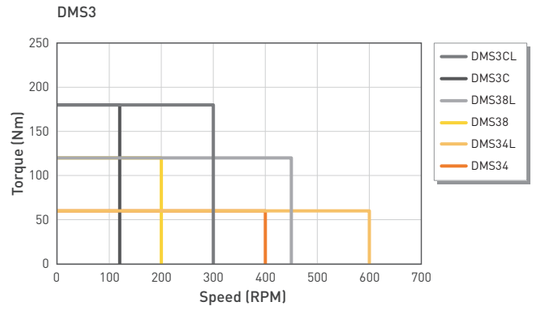
DMS0



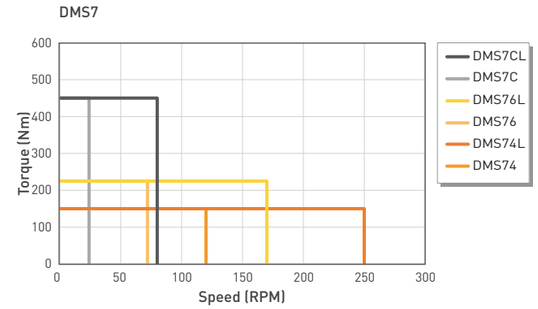
DMS1



DMS3

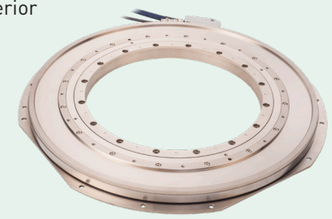


DMS7



DMT Series

DMT series is one of the lowest profile direct drive motors in the market. The compact design significantly decreases the height of the machine. Cables and air tubes can go through the large hollow shaft easily. With high resolution encoder and superior dynamic features, DMT series is suitable for applications of various product inspection and processing.



- Extra large hollow center
- Excellent positioning accuracy. Low speed ripple
- No reduction mechanism needed. Backlash-free
- Highly rigid design

Model Numbers for DMT Series

Motor Specification									Mechanical Specification									
DMT	B	2	-	7	0	S	P	0	0	-	S	0	-	4	Q	S	-	0	-	0

Model

Encoder
F, G: Absolute
7, 8, 9: Analog incremental

Hall Sensor
0: Without hall sensor (Standard)

Winding Code
S: Standard

Temperature Sensor
P: With PTC sensor (Standard)

International Protection Standard
0: IP40 (Standard)

Function Code

Reserved code

Clamp
Without clamp: 0

Mechanical Interface
Standard: S
(According to the drawing)

Connector Type
D-SUB 15P (Encoder): Q
+M17 metallic joint (Motor power cable)

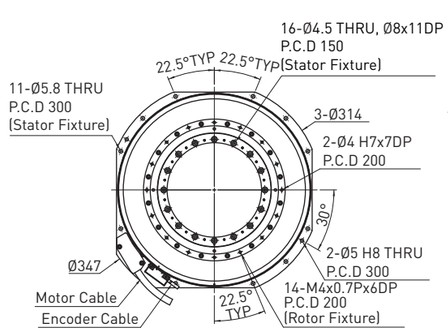
Wire Length
1m (Standard): 4

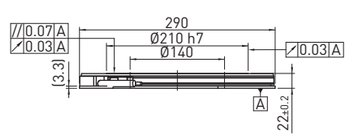
Accuracy Compensation
Without compensation: 0
±10 arc-sec: 1
±5 arc-sec: 4

Axial/Radial Runout (Measuring with jig)
30 μm/30 μm (B2, F2 Standard): S
10 μm/10 μm (K3 standard): B
5 μm/30 μm (only for B2, F2): P
5 μm/15 μm (only for B2, F2): A
5 μm/30 μm <5 μm> (only for B2, F2): E
5 μm/15 μm <5 μm> (only for B2, F2): F

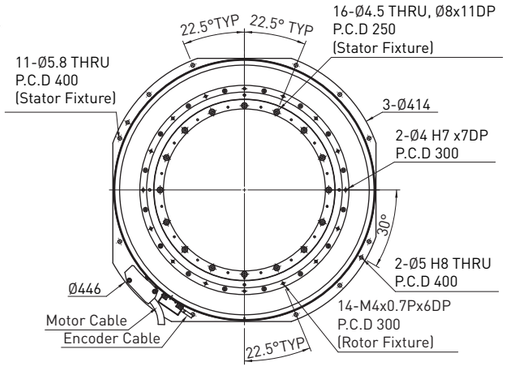
*The product should avoid environment with corrosive gas, cutting oil and metal powder.
*This catalogue only demonstrates absolute encoders. As to incremental encoders, the resolution and connector type may be different. Please consult your local distributor or HIWIN MIKROSYSTEM.

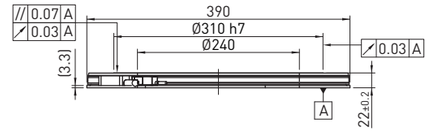
DMT Series Specifications



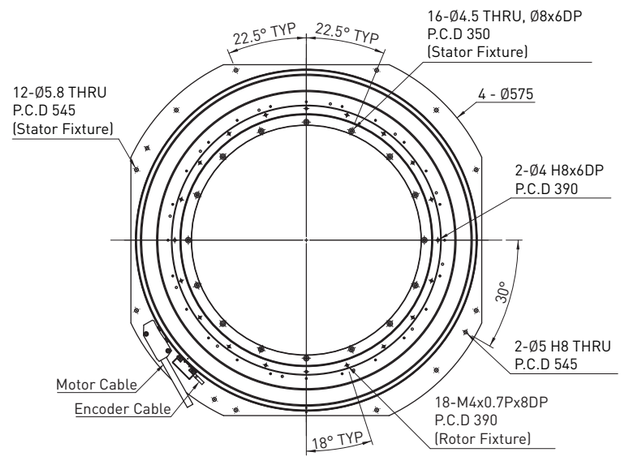


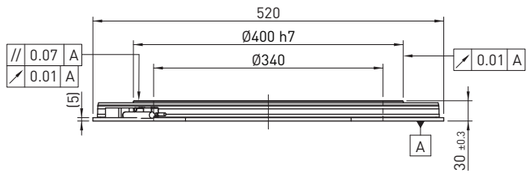
DMTB2





DMTF2





DMTK3

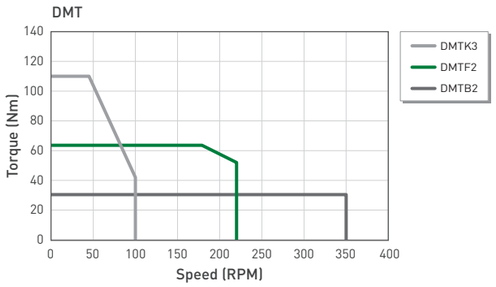
DMT Series Specifications

	Symbol	Unit	DMTB2-□0SP00	DMTF2-□0SP00	DMTK3-□0SP00
Motor power	-	W	334	438	325
Continuous torque	T_c	Nm	9.1	19	31
Continuous current	I_c	A_{rms}	2.6	2.6	2.6
Peak torque (Within 1s.)	T_p	Nm	30.4	63.6	110
Peak current (Within 1s.)	I_p	A_{rms}	8.7	8.7	8.7
Torque constant	K_t	Nm/A_{rms}	3.5	7.3	11.9
Electrical time constant	T_e	ms	0.7	0.7	0.7
Resistance (line to line at 25°C)	R_{25}	Ω	11.7	17.2	23.8
Inductance (line to line)	L	mH	8.6	12.3	16.7
Number of poles	2_p	-	32	48	60
Back emf constant (line to line)	K_v	V_{rms}/(rad/s)	2	4.2	7.8
Motor constant (line to line at 25°C)	K_m	$Nm/\sqrt{W}$	0.8	1.4	2.3
Thermal resistance	R_{th}	K/W	0.63	0.43	0.33
Temperature sensor	-	-	PTC100		
Max.DC Bus	-	V_{DC}	600		
Inertia of rotating parts	J	kgm^2	0.04	0.13	0.4
Mass of motor	M_m	kg	6.5	9.3	20
Max. axial load	F_a	N	500	750	750
Max. moment load	M	Nm	50	75	75
Max. speed	-	RPM	350	220	100
Encoder line count[5]	-	line/rev	22,517	30,418	39,771
Absolute resolution	□	bit	F: 24[4]	G: 25[4]	
Incremental resolution		p/rev	7: 12,969,792	8: 13,018,904	9: 13,044,888
Repeatability[6]	-	arc-sec	±2	±1.5	±1.5
Accuracy[6]	-	arc-sec	±20/±10[1]/±5[1]	±15/±10[1]/±5[1]	±15/±10[1]/±5[1]
Axial runout	R_a	mm	0.03(0.005[2])		0.01
Radial runout	R_r	mm	0.03(0.015[2]) (<0.005>[3])		0.01
Height	H	mm	22	22	30
Hollow shaft diameter	d	mm	140	240	340

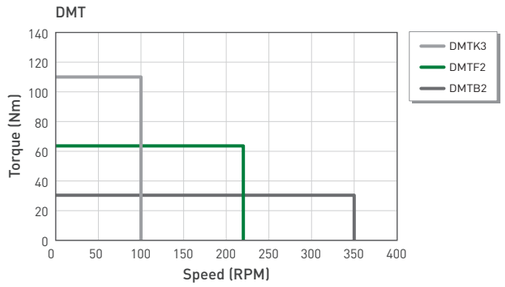
Note: [1]After error mapping
[2]Optional
[3]Optional, The value measurement need with jig. Refer to P.57 for details.
[4]ABS encoder only work with E2 drive.
[5]The encoder output is 1Vpp. For digital TTL output, please contact HIWIN MIKROSYSTEM.
[6]If you have other needs, please consult your local distributor or HIWIN MIKROSYSTEM.
*All the specifications in the table are in ±10% of tolerance except dimensions.

DMT Series T-N Curves

(DC bus voltage=325V_{DC})



(DC bus voltage=600V_{DC})



DMH Series

DMH series motor have high dynamic response, low inertia strucutre to achieve high Production efficiency requirement
In the industrial requirement, with E series driver can achieve more fast, stable, precise.

- High dynamic response
- Low rotor inertia design
- High-speed indexing operation

Model Numbers for DMH Series

Motor Specification										Mechanical Specification								
DMH	6	B	-	4	0	S	P	0	0	-	S	0	-	1	A	S	-	0	-	1

Model

Encoder
E: Absolute
4: Analog incremental
P: Digital incremental

Hall Sensor
0: Without hall sensor

Winding Code
S: Standard

Temperature Sensor
N: Without temperature sensor
P: With PTC sensor (Standard)

International Protection Standard
0: IP40 (Standard)

Function Code

Reserved code

Clamp
Without clamp: 0

Mechanical Interface
Standard: S
(According to the drawing)

Connector Type
Absolute, digital incremental standard: S
(AMP joint)
Analog incremental standard: A
(M17 metallic joint)

Wire Length
0.3 m: 1

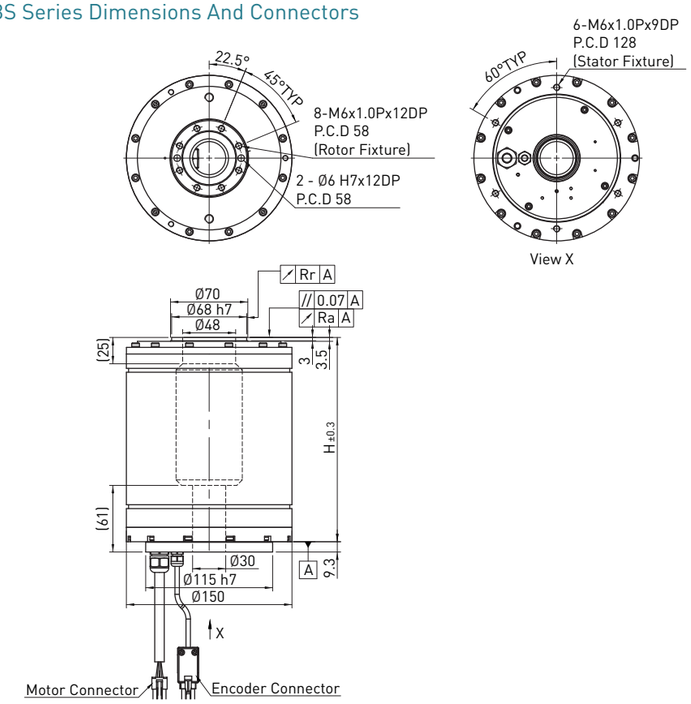
Accuracy Compensation
Without compensation (Standard): 0
±10 arc-sec: 1
±5 arc-sec: 4

Axial/Radial Runout (Measuring with jig)
30 μm/30 μm (Standard): S
5 μm/30 μm: P
5 μm/15 μm: A
5 μm/30 μm <5 μm>: E
5 μm/15 μm <5 μm>: F

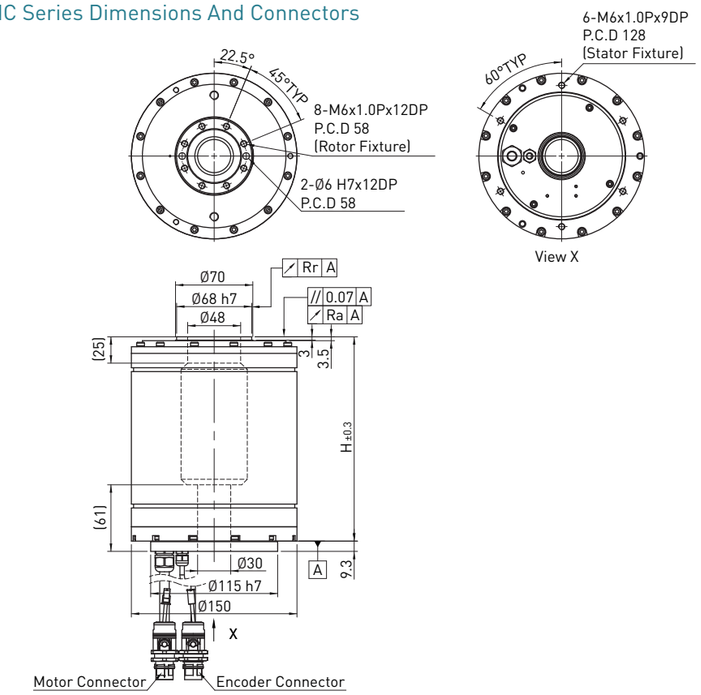
*The product should avoid environment with corrosive gas, cutting oil and metal powder.
*This catalogue only demonstrates absolute encoders. As to incremental encoders, the resolution and connector type may be different. Please consult your local distributor or HIWIN MIKROSYSTEM.

DMH6x Series Specifications

DMH6x ABS Series Dimensions And Connectors



DMH6x INC Series Dimensions And Connectors



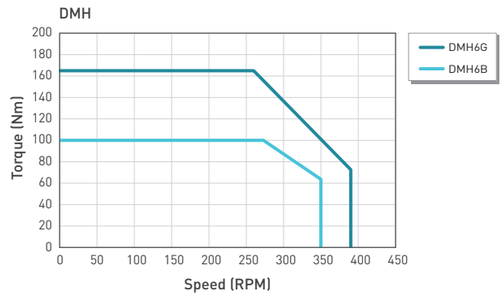
DMH6x Series Specifications

	Symbol	Unit	DMH6B-□0SP00	DMH6G-□0SP00
Motor power	-	W	1319	2655
Continuous torque	T_c	Nm	36	65
Continuous current	I_c	A_{rms}	5.3	8.2
Peak torque (Within 1s.)	T_p	Nm	100	165
Peak current (Within 1s.)	I_p	A_{rms}	15.9	26.24
Torque constant	K_t	Nm/A_{rms}	6.79	7.93
Electrical time constant	T_e	ms	7.3	7.5
Resistance (line to line at 25°C)	R_{25}	Ω	3.85	2.6
Inductance (line to line)	L	mH	28.1	19.5
Number of poles	2_p	-	20	20
Back emf constant (line to line)	K_v	V_{rms}/(rad/s)	3.92	3.97
Motor constant (line to line at 25°C)	K_m	$Nm/\sqrt{W}$	2.82	4.01
Thermal resistance	R_{th}	K/W	0.51	0.386
Temperature sensor	-	-	PTC 120	
Max.DC Bus	-	V_{DC}	600	
Inertia of rotating parts	J	kgm^2	0.00345	0.0046
Mass of motor	M_m	kg	14	18
Max. axial load	F_a	N	800	800
Max. moment load	M	Nm	35	35
Max. speed	-	RPM	350	390
Encoder line count[5]	-	line/rev	2500	
Absolute resolution	□	bit	E: 23[4]	
Incremental resolution		p/rev	4: 4,320,000	
Repeatability[6]	-	arc-sec	±2	
Accuracy[6]	-	arc-sec	±25/±10[1]/±5[1]	
Axial runout	R_a	mm	0.03(0.005[2])	
Radial runout	R_r	mm	0.03(0.015[2])(<0.005>[3])	
Height	H	mm	185	235

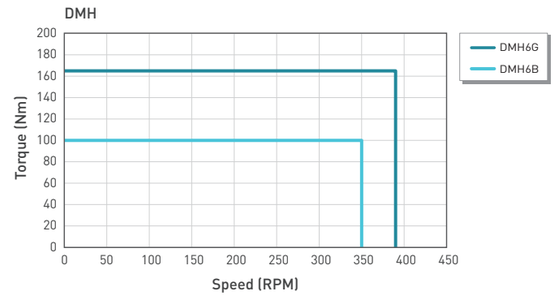
Note: [1]After error mapping
[2]Optional
[3]Optional, The value measurement need with jig. Refer to P.57 for details.
[4]ABS encoder only work with E2 drive.
[5]The encoder output is 1Vpp. For digital TTL output, please contact HIWIN MIKROSYSTEM.
[6]If you have other needs, please consult your local distributor or HIWIN MIKROSYSTEM.
*All the specifications in the table are in ±10% of tolerance except dimensions.

DMH Series T-N Curves

(DC bus voltage=325V_{DC})



(DC bus voltage=600V_{DC})



E Series Servo Drive

- 3.2 kHz speed response
- Tuneless function
- Advanced auto tuning
- Ripple compensation
- Unique gantry control function
- Network with industrial communication devices
- Supports various motor types
- Built-in STO function
- Supports various types of encoders, such as Digital, Analog, Tamagawa, EnDat and BiSS-C

Applications

Industries related to VDU, semiconductor, automation, laser cutting, PCB, etc.

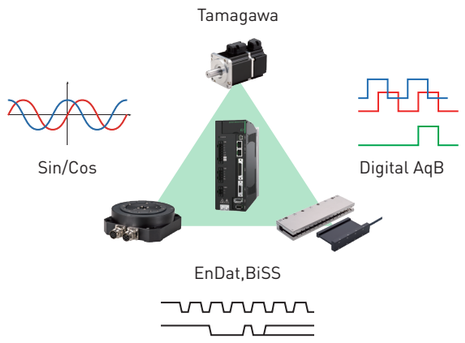
PROFINET
MECHATROLINK
EtherCAT
EtherNet/IP

Webpage Catalog

SCAN ME

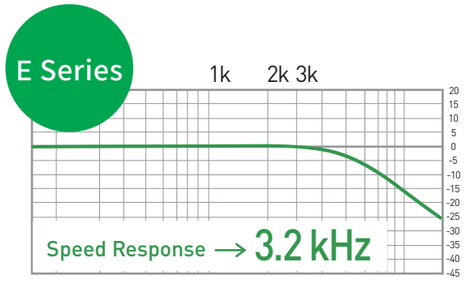
1 Support Various Encoder / Motor Types

Support AC Servo Motors, Direct Drive Motors, Linear Motors, and various encoder formats.



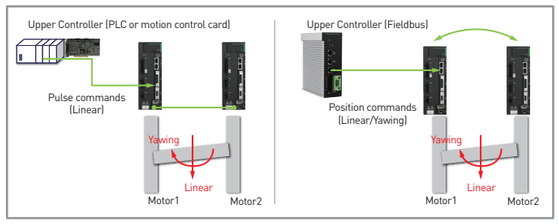
2 3.2 kHz Speed Response

Higher speed response, faster settling time, and higher productivity.



5 Unique Gantry Control Function

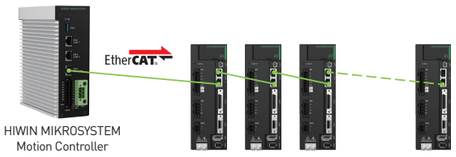
Connect two fast-response drives with drive-level control circuit and linear & yaw movement to achieve high performance of a controller on a wide-span gantry.



6 Network with Industrial Communication

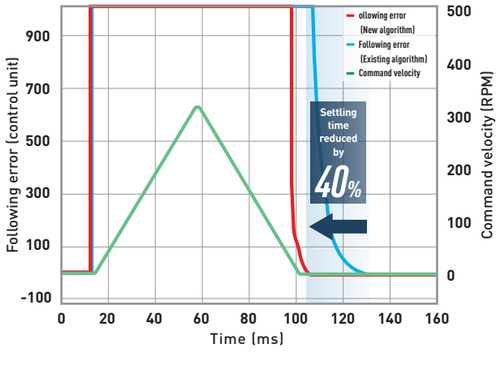
Support EtherCAT®, MECHATROLINK-III, PROFINET and EtherNet/IP. E series servo drive can also be connected to HIWIN EtherCAT (CoE) controllers.

Note: EtherNet/IP is only applicable to E2 series servo drive.



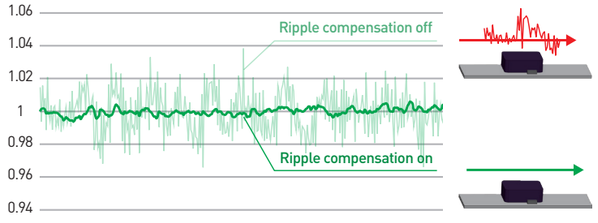
3 Fast In-Position Performance

Fast and accurate precision positioning achieves fast response and increases equipment productivity. With our next-generation algorithm, the vibration of mechanism can be suppressed and the shaking in positioning can be solved, which improves the performance of servo motor to quickly enter the designated target position.



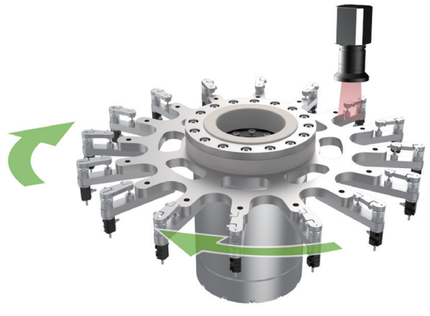
4 Ripple Compensation

Effectively suppress the speed ripple caused by motor cogging, and allow ironcore motor to achieve smooth motion in detection and scanning applications.



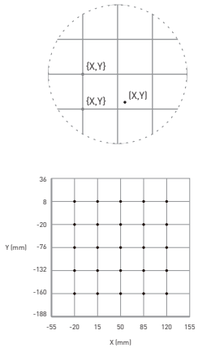
7 Built-in Multi-Motion Function

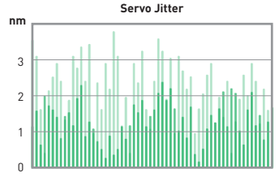
Tabulated pull-down menu of motion commands to simplify programming of typical motions.



8 High Accuracy in Nano-Positioning

GT model supports nano-positioning for semiconductor equipment with high accuracy and supports 2D error map by using two sets of servo drives to achieve high accuracy and straightness on XY plane.





Drive

Combinations to work with servo drive

Drive		E1 servo drive	E2 servo drive
DM series		Model	
DMY series	DMY4x	ED1□-□□-05	ED2□-□□-006
	DMY6x	ED1□-□□-10	ED2□-□□-006
	DMYA3/A5	ED1□-□□-04	ED2□-□□-003
	DMYAA	ED1□-□□-10	ED2□-□□-006
DMN series	DMN2x	ED1□-□□-04	ED2□-□□-003
	DMN4x	ED1□-□□-04	ED2□-□□-003
	DMN71	ED1□-□□-10	ED2□-□□-006
	DMN93	ED1□-□□-10	ED2□-□□-006
	DMN95	ED1□-□□-10	ED2□-□□-006
	DMN9A	ED1□-□□-20	ED2□-□□-012
DMS series	DMS0x	ED1□-□□-04	ED2□-□□-003
	DMS1x	ED1□-□□-10	ED2□-□□-006
	DMS3x	ED1□-□□-05	ED2□-□□-003
	DMS3x-□□L	ED1□-□□-12	ED2□-□□-006
	DMS7x	ED1□-□□-05	ED2□-□□-003
	DMS7x-□□L	ED1□-□□-12	ED2□-□□-006
DMT series	DMTxx	ED1□-□□-05	ED2□-□□-003
DMH series	DMH6B	ED1□-□□-10	ED2□-□□-006
	DMH6G	ED1□-□□-20	ED2□-□□-009

*E1 series can work with incremental encoder direct drive motor.
ESC(Excellent Smart Cube)is requested for incremental encoders.
*E2 series can be used with direct drive motors of various encoders

Direct Drive Motor - Accessories

Appendix

Appendix A : Motor Sizing

Start Motor Sizing

The following contents describe how to choose a proper motor according to speed, moving distance, and loading inertia. The basic process for sizing a motor is:

Requirements

- Operating environment
- Installation (horizontal or vertical)
- Driving method
- Load conditions (loading inertia, friction and cutting force)
- Speed condition (maximum acceleration and velocity)
- Duty cycle

↓

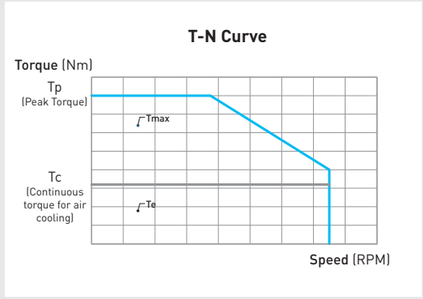
Torque Calculation

- Calculate the torque corresponding to the speed under each operation condition
- Calculate equivalent torque

↓

Motor Sizing and T-N Curve Confirmation

- Select the appropriate motor from the HIWIN's catalogue in accordance with calculated maximum torque, equivalent torque and speed.
- Ensure the speed and the corresponding torque under all operating conditions are within the range of torque-speed curve of the motor.
- Confirm the equivalent torque is within the continuous torque of the motor.



Symbol :

θ: Angular displacement (rad)
t: Moving time(sec)
α: Angular acceleration(rad/s^2)
ω: Angular velocity (rad/s)
J: Load inertia(kgm^2)
J_m: Rotor inertia (kgm^2)
T_p: Peak torque (Nm)
T_c: Continuous torque (Nm)
T_i: Inertia torque(Nm)
K_t: Torque constant(Nm/Arms)
I_p: Peak current(Arms)
I_e: Equivalent current (Arms)
I_c: Continuous current(Arms)
ω0: Initial angular velocity(rad/s)
m:Loading Mass(kg)
R:External diameter of loading Mass(m)
r: Internal diameter of loading Mass(m)
a、b: Side length of loading Mass(m)
S:Distance from gravity center to rotary center(m)

STEP1 Requirements

In order to select the motor that meet user's needs, the following formula of load inertia motion must be understood prior to the selection.

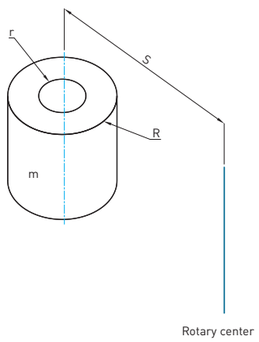
Calculation of loading inertia

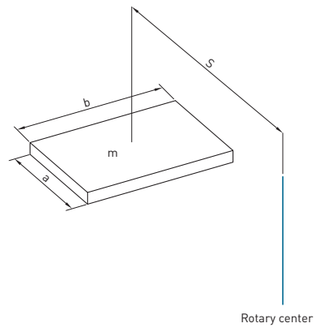
Loading inertia can be determined by 3D drawing software or according to the formula. The basic loading formula is as follows:
Moment of inertia of a hollow cylinder

$$J = m\left(\frac{R^2 + r^2}{2} + S^2\right)$$

Moment of inertia of a rectangular

$$J = m\left(\frac{a^2 + b^2}{12} + S^2\right)$$





Determine the motion speed and parameters

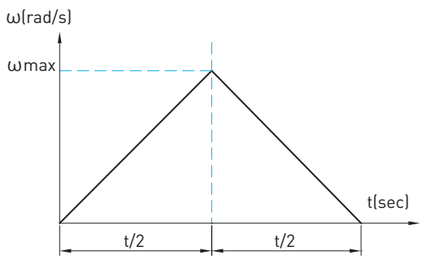
Basic kinematics equations are described as follows:

$$\omega = \omega_0 + \alpha t$$

$$\theta = \omega_0 t + \frac{1}{2}\alpha t^2$$

Where ω is angular velocity, α is angular acceleration, t is moving time and θ is angular displacement. Choose two of the four parameters (ω, α, t andθ) as user's designed parameters, then the left two parameters can be calculated by above equations.

Motion Velocity Profile
The motion profiles for direct drive motors are usually classified as "Trapezoid Profile" and "Triangle Profile", where the Trapezoid Profile is frequently used for scanning. The motion profiles are divided as acceleration, constant velocity and deceleration. The maximum angular acceleration can be determined by the basic kinematics equations above-mentioned; the Trapezoid Profile is usually used in point-to-point application. The motion profiles are divided as acceleration and deceleration, where the motion profile and formula can be simplified as follows:



$$\omega_{max} = 2 \times \frac{\theta}{t} \quad \text{or} \quad \omega_{max} = \sqrt{\alpha \times \theta}$$

$$\alpha_{max} = \frac{4\theta}{t^2}$$

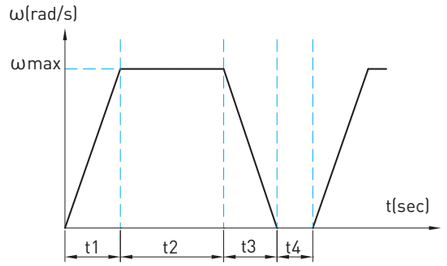
STEP 2 Torque Calculation

The maximum torque can be calculated by the following equation

$$T_{max} = (J + J_m) \times \alpha_{max} + T_f = T_i + T_f$$

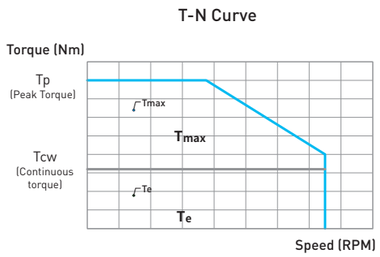
Where Ti is inertia torque, Tf is the torque which is caused by friction, cutting force or external force.In most cases, the motions are cyclic point-to-point movements. Assuming a cyclic motion shown in the following profile with a dwell time of t4 second, the effective force can be calculated as follows:

$$T_e = \sqrt{\frac{(T_i + T_f)^2 \times t_1 + T_f^2 \times t_2 + (T_i - T_f)^2 \times t_3}{t_1 + t_2 + t_3 + t_4}}$$



STEP 3 Motor Sizing and T-N curve Confirmation

With the help of HIWIN's motor specification, users can select the appropriate motor from peak torque and equivalent torque, and ensure the speed and torque under all operating conditions are within the range of the T-N curve for the motor.



The motor sizing is determined as follows:
Tmax <Tp
Te < Tc
The user needs to consider the ratio of equivalent torque and continuous torque. Usually the ratio (Te/Tc)is recommended within 0.7.
The peak current (Imax) and effective current (Ie) can be calculated by bringing motor torque constant into the following equation (For Kt, please refer to Appendix B)

$$I_{max} = \frac{T_{max}}{K_t} \quad I_e = \frac{T_e}{K_t}$$

Example of motor sizing

Loading requirement: An aluminum disc with ϕ500mm and 15mm thick without offset and weight is 12kg. There are eight jigs with 100x50x50mm on the aluminum disc at an interval of 45°. Each jig weighs 1 kg. The distance from the jig gravity center to the rotary center is 150mm, and the mechanical friction force is 2Nm.
Speed requirement: Each position 45° is completed in 0.3 seconds, and rests for 1 second.

STEP1 Requirement Confirmation

Calculation of loading inertia
Inertia of disc

$$J_1 = m\left(\frac{R^2 + r^2}{2} + S^2\right) = 12\left(\frac{0.25^2 + 0^2}{2} + 0^2\right) = 0.375\,kgm^2$$

Inertia of jig

$$J_2 = m\left(\frac{a^2 + b^2}{12} + S^2\right) = 1\left(\frac{0.1^2 + 0.05^2}{12} + 0.15^2\right) = 0.0235\,kgm^2$$

Total inertia

$$J = J_1 + 8 \times J_2 = 0.375 + 8 \times 0.0235 = 0.563\,kgm^2$$

Motion profile
It is a point-to-point application. The maximum angular velocity and the maximum angular acceleration are calculated as follows:

$$\theta = 45° = \frac{45 \times \pi}{180} = 0.7854\,rad$$

$$\omega_{max} = 2 \times \frac{\theta}{t} = 2 \times \frac{0.7854}{0.3} = 5.236\,rad/s = 50\,rpm$$

$$\alpha_{max} = \frac{4\theta}{t^2} = \frac{4 \times 0.7854}{0.3^2} = 34.91\,rad/s^2$$

STEP 2 Torque Calculation

It is recommended that the ratio loading inertia (J) over motor rotator inertia (Jm) be less than 150[1]. It can be roughly estimated 30 in motor sizing. Since J/30=0.563/30=0.019kgm², user can select the DMS34 (Jm=0.02 kgm²)

$$T_{max} = (J+J_m) \times \alpha_{max} + T_f = T_i + T_f = (0.563 + 0.02) \times 34.91 + 2 = 20.4 + 2 = 22.1Nm$$

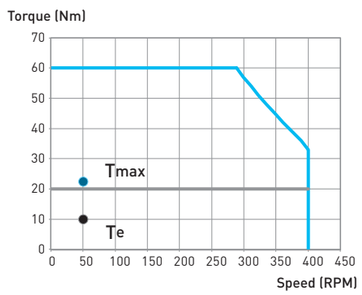
Where Ti=20.4Nm, Tf=2Nm

$$T_e = \sqrt{\frac{(T_i + T_f)^2 \times t_1 + T_f^2 \times t_2 + (T_i - T_f)^2 \times t_3}{t_1 + t_2 + t_3 + t_4}} = \sqrt{\frac{(20.4+2)^2 \times 0.15 + 2^2 \times 0 + (20.4-2)^2 \times 0.15}{0.15 + 0 + 0.15 + 1}} = 9.9Nm$$

Note: *E1, E2series drives are recommended the inertia ration less than 150.

STEP 3 Motor Sizing and T-N curve Confirmation

Finally, DMS34 can be selected according to the Tmax and Te. The peak torque Tp=60Nm, the continuous torque Tc=20Nm, the torque constant Kt=6.6 Nm/Arms, and the speed/torque, Te, under all operating conditions are within the range of T-N curve for DMS34.



Appendix B : Glossary

1. Back EMF constant (Line to Line): Kv $\left(\frac{V_{rms}}{rad/s}\right)$

The back EMF constant, K_v, is the ratio of the back EMF voltage (V_{rms}) to the motor rotational speed (rad/s) when the magnet is at 25°C. It is created at the movement of the coil in the magnetic field of permanent magnets.

2. Continuous current: I_c (A_{rms})

The continuous current, I_c, is the current that can be continuously supplied to the motor coils at the ambient temperature 25°C, and the final temperature of coil can't exceed 100°C. Under this condition, the motor reaches the rating continuous torque T_c.

3. Continuous torque: T_c (Nm)

The continuous torque, T_c, is the maximum torque the motor is able to generate continuously at the ambient temperature 25°C and the final temperature of coil can't exceed 100°C). This continuous torque correspond to I_c supplied to the motor.

4. Inductance (line-to-line): L (mH)

Inductance is defined as inductance measured between lines when the motor operates at the coil temperature 25°C .

5. Resistance at 25°C (line-to-line): R_{25} (Ω)

Resistance is defined as resistance measured between lines when the motor operates at the coil temperature 25°C.

6. Motor constant: Km $\left(\frac{Nm}{\sqrt{W}}\right)$

The motor constant, K_m, is defined as the ratio of square root of motor output torque to consumption power when the coils and magnets are at 25°C. The larger motor constant represents the lower power loss when the motor outputs at the specific torque.

7. Number of poles: 2p

2p represents the number of poles of the rotor, where p is the number of pole pairs.

8. Peak current: I_p (A_{rms})

The peak current, I_p, is the current corresponding to torque output of the motor, and the motor temperature reached by current can't demagnetize magnet. Generally speaking, peak current can be granted to supply 1 second when the motor is operating in the normal condition and the input current phase is balanced.

9. Peak torque: T_p (Nm)

The peak torque, T_p, is the maximum torque that the motor outputs less than 1 second. Peak current corresponding to the torque cannot demagnetize magnet.

10. Rotor inertia: J (kgm^2)

The rotor inertia, J, is the rotary component resists any changes in its state of motion, including changes to its speed and direction. It is related to the shape and mass.

11. Stall current: I_s/I_{sw} (A_{rms})

The stall current , I_s, is the upper limit of current when the motor is at the room temperature 25°C and in the stall condition.

12. Stall torque: T_s/T (Nm)

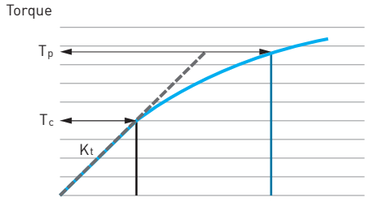
The stall torque , T_s , is the upper limit of torque when the motor is at the room temperature 25°C and in the stall condition.

13. Thermal resistance: R_{th} (K/W)

The thermal resistance, R_{th}, is defined as the resistance heat suffered from motor coil by the heat dissipated into the environment. (consider the natural convection and radiation for air cooling when ambient air is at 25°C; Higher thermal resistance represents the larger temperature difference between the coil and environment under the same heat source.)

14. Torque constant: K_t (Nm/A_{rms})

The torque constant, K_t, is ratio between as the motor's output torque per RMS current. Output torque and input current shows a linear relationship at low current. The non-linear relationship is due to saturation in the iron core.



15. Maximum speed (rpm)

Maximum speed is defined as maximum speed provided under specific torque (usually continuous torque). If there is a bearing installed inside the motor, the maximum speed may be limited by the bearing's DN value. There are two conditions to define the maximum speed of the motor:
maximum speed under continuous torque, maximum speed under peak torque.

16. Electrical time constant: T_e (ms)

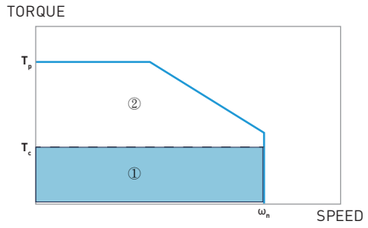
Electrical time constant is defined as the ratio of line-to-line inductance and line-to-line resistance.

17. Rated speed: ω_n (rpm)

The rated speed is defined as the speed at which when the motor is running continuously without a break and, the rotor does not suffer from excessive rotor temperature (>80 °C) due to iron loss, if the speed is exceeded, the duty cycle must be reduced or an additional rotor heat dissipation design must be done.Please refer to 17. T-N curve for details regarding motor operation range.

18. T-N Curve

The T-N curve is defined as the comparison chart of the torque and the speed that can be output under a certain input voltage of the motor. Considering the temperature rise of the motor, the figure can be divided into two operating ranges as shown below:



① When the motor is air-cooled and the torque is less than Tc, it can run continuously below ωn without break.
② When the motor torque is greater than Tc or the duty cycle must be reduced. When Tp is reached, only 1 second output is allowed to avoid overheating of the stator.

19. Maximum input voltage: (V_{DC})

Maximum input voltage is the maximum voltage for the motor operating in the normal environment.

20. Resolution: (p/rev)

Resolution is the quantity of the motor feedback points during one rotation.

21. Accuracy: (arc-sec)

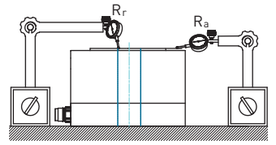
Accuracy is the error between the target position and the actual position; in the HIWIN's definition, the motor is measured clockwise and counterclockwise twice per 22.5° to take the maximum error.

22. (Bi-) Repeatability: (arc-sec)

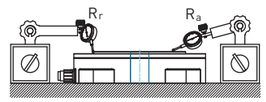
(Bi-)Repeatability is the repetition when the motor moves to the same angle.

23. Axial runout and radial runout:

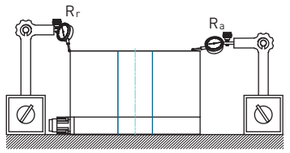
Axial runout is the measurement of the maximum deviation of motion parallel to the axis of rotation. Radial runout is the measurement of the maximum deviation of the motion perpendicular to the axis of rotation. Both runouts are measured over a full rotation of the axis and are measured on the rotating surface of the table.The rotating surface varies by rotary table model type, as illustrated below.



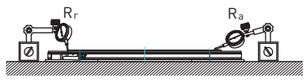
(A) DMS inner rotation type



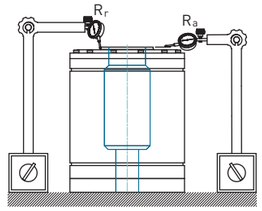
(B) DMN Outer rotation type



(C) DMY outer rotation type

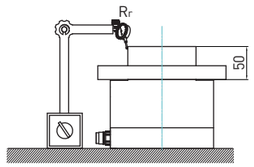


(D) DMT outer rotation type



(E) DMH inner rotation type

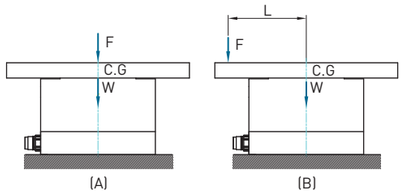
For option <measuring with jig>, the measuring point is 50 mm above top of motor, refer to figure below.

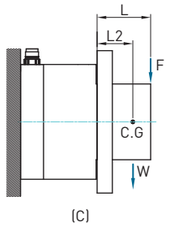


24. Loading capacity:

The load of motor must be considered when it is operating. The load can be calculated by external force and the installation to identify the motor structure tolerates or not. The axial force (Fi, i=A,B,C) applied to the motor in the calculation needs be less than the maximum axial load $F_i < F_a$, and can be used when the applied torque (Mi, i=A,B,C) needs to be less than the maximum torque load $M_i < M$.

- Horizontal installation, external force on C.G point (Figure A)
  Asume external force F, axial force applied to the motor FA=F+loading weight W
- Horizontal installation, external force on distance L from C.G point(Figure B)
  Asume external force F, axial force applied to the motor FB=F+loading weight W
  Torque applied to the motor MB=FxL
- Laterally installation, external force on top of loading (Figure C)
  Asume external force F, axial force applied to the motor FC=F+loading weight W Torque applied to the motor MC=Fx(L+0.03m)+Wx(L2+0.03m)





25. Maximum continuous power loss: P_c (W)

Maximum continuous power loss is the energy lost when the motor runs continuously under continuous current and the coil temperature is 100°C .

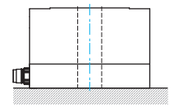
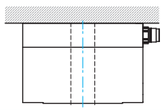
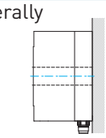
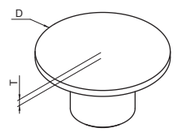
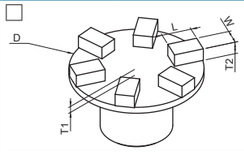
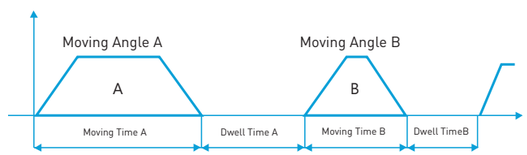
26. Motor power (W):

Motor power is the maximum continuous rated power of the motor.

Appendix C : Environment

Operating Temperature	Temperature	+5 to +40°C
	Humidity	20 to 85% RH (no condensation)
Storage Temperature	Temperature	-10 to +50°C
	Humidity	20 to 85% RH (no condensation)
Atmosphere	Under 1000m, no corrosive gas, liquid and powder	

Appendix D : Motor Inquiry Form

Company Name:	Email:	Tel:
Industrial:	Project Name:	
Environment	☐Normal environment(25℃)	☐Clean room,Class:
	☐Polluted environment	☐Other:
Installation	☐Horizontal 	☐Upside Down  ☐Laterally 
Load Type	☐ 	☐  ☐Other
Load Conditions	Total moment of inertia: _____kgm^2 , Size:_____mm Separate document ☐Attached ☐Not attached	
	☐Balanced load (Number: _____,Mass:_____or Material:_____,Size: _____)	
	☐Unbalanced load (Number:_____,Mass:_____or Material:_____,Size:_____,Offset of C.G.:_____mm)	
	Note:	
Force	☐None ☐Yes:____kg,Offset of C.G.:____mm ☐At all times ☐When stopped ☐When rotating	
Application		☐Point to Point ☐Scan Moving Angle A:_____° Moving Time A:_____sec Dwell Time A:_____sec Moving Angle B:_____° Moving Time B:_____sec Dwell Time B:_____sec
Required Accuracy	Repeatability:±( )arcsec *Repeatability:±( )μm, Offset of C.G. ( )mm Accuracy:±( )arcsec *Accuracy:±( )μm, Offset of C.G. ( )mm *optional	
Table Surface Rotation Accuracy	☐Standard ☐Customized (Axial run out_____μm、Radial run out_____μm)	
Clamp	☐None ☐Power Off Clamp ☐Power On Clamp	
Other Requirements		

Appendix E : FAQ

1. What is the difference between inner-rotation and outer-rotation type direct drive motors?

If we compare an inner rotation type and an outer rotation type direct drive motors of the same size, the outer rotation type one has larger torque. This is because its mechanical structure has a moment arm of a great distance. The inertia of the outer rotation type rotators is naturally bigger than that of the inner rotation type rotators. Therefore, when the outer rotation type motors work with loads, the inertia ratio of the load is smaller, which makes control easier.

2. How do mechanical transmissions compare with direct drive motors?

Mechanical transmission refers to motion performed by reducers, belts, worm gears and ball screws. Comparisons are listed in below table:

	Mechanical Transmission	Direct Drive Motors	Explanation
Structure	Complicated	Simple	-
Size	Bigger	Smaller	-
Accuracy	Low	(Very) High	Resulted from backlash
Noise	Loud	Quiet	-
Duration	Short	Long	-
Control and Drive	Simple	Complicated	-
Maximum Speed	Low	High	Resulted from speed reduction ratio

3. What is the difference between axial runout and radial runout, and why is radial runout more critical in direct drive motor applications?

Radial runout is more influential to direct drive motor applications. When the workpiece is put on the motor, the axial runout shows the up and down swing of the rotating workpiece, which may have negative effect on the machining and processing.

4. How does motor inertia affect direct drive motor performance?

The inertia ratio of a servo motor is usually less than 15 or 10 times. This principle does not apply to direct drive motors in automation tasks. The best principle of the load inertia of a direct drive motor is less than 80 times.

5. What is the difference between constant torque and peak torque in a motor, and how should each be applied?

Continuous torque is the torque powered by continuous current. Peak torque is the torque powered by peak current. Peak current cannot be input continuously. It can be input for only a few seconds or less; otherwise, the motor will be damaged.

Practically, peak torque is used during acceleration or deceleration. We can imagine a sprinter’ s energy output maximizes during acceleration or deceleration; However, the the sprinter cannot run a long distance without rest. Continuous torque is used to compare with equivalent torque, which is calculated from actual motion. If equivalent torque is less than continuous torque, the design should work well. If equivalent torque is greater than continuous torque, the motor will over-heat.

6. What is the difference among a position clamp, a safety clamp and a safety clamp (backlash-free)?

Position clamp: To clamp when the motor is in position. Reduce the resistance of the motor to outer
Safety clamp: To prevent the equipment from collision or moving caused by powering off.

Safety clamp(zero backlash): To clamp when power is off, ensuring the motor remains in position and preventing machine collision or unintended movement.

Direct Drive Motor Technical Information

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