

10. Reference

10.1 Standard Specifications

(1) Motor Section

Series			DM B series					DM A series				
Model			DM1015B 00-1	DM1030B 00-1	DM1045B 00-1	DM1060B 00-1	DM1075B 00-1	DM1050A 00-1	DM1100A 00-1	DM1150A 00-1	DM1200A 00-1	
Motor & driver coupling	Maximum torque	N·m(kgf·m)	15(1.5)	30(3.0)	45(4.5)	60(6.0)	75(7.5)	50(5.0)	100(10)	150(15)	200(20)	
	Maximum velocity	rps	2.4					1.2				
	Rated velocity	rps	2.0(2.0)	2.0(1.5)	2.0(1.0)	1.5(1.0)	2.0(1.0)	1.0(1.0)		1.0(0.5)		
	Rotational positioning	Encoder resolution	p/rev	655,360					1,024,000			
		Positioning accuracy	Sec	±15					±15			
Repeatability		Sec	±2					±2				
Motor section specifications	Rotor inertia		kg·m ²	12×10 ⁻³	15×10 ⁻³	19×10 ⁻³	23×10 ⁻³	27×10 ⁻³	96×10 ⁻³	119×10 ⁻³	142×10 ⁻³	167×10 ⁻³
	Static max load	Axial load	C	3.0×10 ⁻⁴ (3.0×10 ⁻³)				4.0×10 ⁻⁴ (4.0×10 ⁻³)				
			T	1.0×10 ⁻⁴ (1.0×10 ⁻³)				2.0×10 ⁻⁴ (2.0×10 ⁻³)				
	Overhung load		N·m(kgf·m)	200(20)				400(40)				
	Torsional stiffness	Axial stiffness	C	2.5×10 ⁻⁴ (2.5×10 ⁻³)				2.0×10 ⁻⁴ (2.0×10 ⁻³)				
			T	3.0×10 ⁻⁴ (3.0×10 ⁻³)				3.0×10 ⁻⁴ (3.0×10 ⁻³)				
	Radial stiffness		rad/N·m (rad/kgf·m)	1.0×10 ⁻⁴ (1.0×10 ⁻³)				4.0×10 ⁻⁴ (4.0×10 ⁻³)				
	Weight		kg	5.5	7.5	9.5	12	14	14.5	19	24	29
Height (refer to dimensions)		mm	92.5 ^{±1}	118 ^{±1}	143 ^{±1}	166 ^{±1}	194 ^{±1}	113 ^{±1}	136 ^{±1}	153 ^{±1}	169 ^{±1}	

C: Compression; T: Tension

Series			DR B series					DR E series							
Model			DR100B 00-1	DR105B 00-1	DR100B 00-1	DR1045B 00-1	DR1060B 00-1	DR100E 00-1	DR1070E 00-1	DR1100E 00-1	DR1130E 00-1	DR1160E 00-1	DR1200E 00-1	DR1250E 00-1	
Motor & driver coupling	Maximum torque	N·m(kgf·m)	8(0.8)	15(1.5)	30(3.0)	45(4.5)	60(6.0)	30(3)	70(7)	100(10)	130(13)	160(16)	220(22)	250(25)	
	Maximum velocity	rps	2.4(2.4)		2.4(1.8)	2.4(1.4)	2.4(2.0)	2.4(1.5)	1.2(1.2)	1.2(1.0)	1.2(0.7)				
	Rated velocity	rps	2.0(2.0)	2.0(1.5)	2.0(1.0)	1.5(1.0)	2.0(1.5)	2.0(1.5)	1.5(1.0)	1.0(0.5)					
	Rotational positioning	Encoder resolution	p/rev	507,904					614,400						
		Positioning accuracy	Sec	±45					±45						
Repeatability		Sec	±5					±5							
Motor section specifications	Rotor inertia		kg·m ²	15×10 ⁻³	21×10 ⁻³	24×10 ⁻³	26×10 ⁻³	33×10 ⁻³	72×10 ⁻³	85×10 ⁻³	100×10 ⁻³	125×10 ⁻³	140×10 ⁻³	170×10 ⁻³	185×10 ⁻³
	Static max load	Axial load	C	3.0×10 ⁻⁴ (3.0×10 ⁻³)				4.0×10 ⁻⁴ (4.0×10 ⁻³)							
			T	1.0×10 ⁻⁴ (1.0×10 ⁻³)				2.0×10 ⁻⁴ (2.0×10 ⁻³)							
	Overhung load		N·m(kgf·m)	200(20)				400(40)							
	Torsional stiffness	Axial stiffness	C	3.0×10 ⁻⁴ (3.0×10 ⁻³)				2.0×10 ⁻⁴ (2.0×10 ⁻³)							
			T	4.0×10 ⁻⁴ (4.0×10 ⁻³)				3.0×10 ⁻⁴ (3.0×10 ⁻³)							
	Radial stiffness		rad/N·m (rad/kgf·m)	2.0×10 ⁻⁴ (2.0×10 ⁻³)				4.0×10 ⁻⁴ (4.0×10 ⁻³)							
	Weight		kg	6.0	9.0	11	13	15.5	18	22	26	32	36	44	49
Height (refer to dimensions)		mm	85 ^{±1}	123 ^{±1}	151 ^{±1}	179 ^{±1}	207 ^{±1}	155 ^{±1}	183 ^{±1}	210 ^{±1}	243 ^{±1}	271 ^{±1}	327 ^{±1}	355 ^{±1}	

C: Compression; T: Tension

NOTE: The specifications are for the systems operating under 200 - 230 V AC only. However, the values in the [] are for systems operating in the range of 100 - 115 V AC.

Series			DR A series						
Model			DR1050A00*1	DR1100A00*1	DR1150A00*1	DR1200A00*1	DR1300A00*1	DR1400A00*1	
Motor & driver coupling	Maximum torque		N·m(kgf·m)	50(5)	100(10)	150(15)	200(20)	300(30)	400(40)
	Maximum velocity		rps	1.8(1.8)	1.2(1.2)	1.2(1.0)	1.2(0.8)	1.0(0.5)	0.8(0.4)
	Rated velocity		rps	1.5(1.5)	1.0(1.0)	1.0(0.5)		0.5(0.25)	
	Rotational positioning	Encoder resolution		p/rev	819,200				
Positioning accuracy		Sec	±30						
Repeatability		Sec	±5						
Motor section specifications	Rotor inertia		kg·m ²	180×10 ⁻³	200×10 ⁻³	230×10 ⁻³	285×10 ⁻³	340×10 ⁻³	400×10 ⁻³
	Static max load	Axial load	C	4.0×10 ⁴ (4.0×10 ³)					
			T	2.0×10 ⁴ (2.0×10 ³)					
	Overhung load		N·m(kgf·m)	400(40)					
	Torsional stiffness	Axial stiffness	C	2.0×10 ⁻⁶ (2.0×10 ⁻⁵)					
			T	3.0×10 ⁻⁶ (3.0×10 ⁻⁵)					
		Radial stiffness		rad/N·m (rad/kgf·m)	4.0×10 ⁻⁷ (4.0×10 ⁻⁶)				
	Weight		kg	26	31	36	45	55	65
	Height (refer to dimensions)		mm	158 ^{±1}	185 ^{±1}	212 ^{±1}	250 ^{±1}	304 ^{±1}	358 ^{±1}

C: Compression; T: Tension

Series			DR B series			DR E series		
Model			DR503B00*1	DR505B00*1	DR507B00*1	DR5070E	DR5100E	
Motor & driver coupling	Maximum torque		N·m(kgf·m)	30(3.0)	50(5.0)	70(7.0)	70(7)	100(10)
	Maximum velocity		rps	5.0			4.0	
	Rated velocity		rps	4.0			2.0	
	Rotational positioning	Encoder resolution		p/rev	278,528			319,488
Positioning accuracy		Sec	±90			±90		
Repeatability		Sec	±10			±6		
Motor section specifications	Rotor inertia		kg·m ²	27×10 ⁻³	34×10 ⁻³	37×10 ⁻³	100×10 ⁻³	125×10 ⁻³
	Static max load	Axial load	C	3.0×10 ⁴ (3.0×10 ³)			4.0×10 ⁴ (4.0×10 ³)	
			T	1.0×10 ⁴ (1.0×10 ³)			2.0×10 ⁴ (2.0×10 ³)	
	Overhung load		N·m(kgf·m)	200(20)			400(40)	
	Torsional stiffness	Axial stiffness	C	3.0×10 ⁻⁶ (3.0×10 ⁻⁵)			2.0×10 ⁻⁶ (2.0×10 ⁻⁵)	
			T	4.0×10 ⁻⁶ (4.0×10 ⁻⁵)			3.0×10 ⁻⁶ (3.0×10 ⁻⁵)	
		Radial stiffness		rad/N·m (rad/kgf·m)	2.0×10 ⁻⁶ (2.0×10 ⁻⁵)			4.0×10 ⁻⁷ (4.0×10 ⁻⁶)
Weight		kg	13.5	16.0	18.0	26	32	
Height (refer to dimensions)		mm	184 ^{±1}	212 ^{±1}	240 ^{±1}	210 ^{±1}	243 ^{±1}	

C: Compression; T: Tension

Common specifications:

Insulation class: F type
 Insulation withstanding voltage: 1500 VAC for 1 minute
 Insulation resistance: Greater than 10MΩ (500V DC)

Motor construction details:

Rotor specification: Outer rotor type
 Drive excitation: 3 phase
 Colour: Black

NOTE: The specifications are for the systems operating under 200 - 230 V AC only. However, the values in the [] are for systems operating in the range of 100 - 115 V AC.

(2) Driver Section (common specifications)

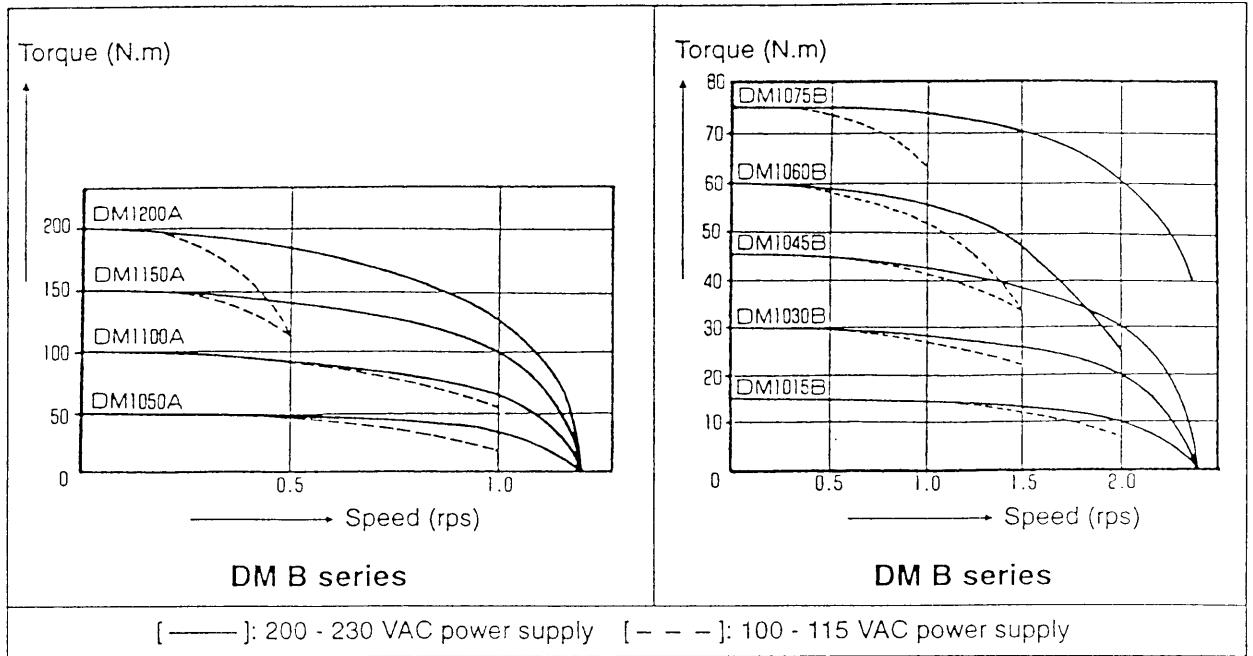
Item		Contents
Communication modes		<ul style="list-style-type: none"> ■ RS232C (Single/Multichannel) communications @9600 bps (maximum 9 channels under multi channel mode) ■ Parallel communications
Connection devices	RS232C	<ul style="list-style-type: none"> ■ IBM PC/AT compatible machine with Windows '95 operating system [Parameter backup, program editing, data backup, terminal mode, I/O Logic type selection, Servo settings, Index compensation and monitoring functions] ■ TBX (Teaching box) [Parameter settings, monitor functions]
Operation modes	Test mode	Use in manual tuning
	Auto-tuning mode	The DC gain, fc and ILim are automatically set.
	Homing mode	The type of homing is changed by parameter settings
	Program mode	Maximum number of programs are 100; maximum program blocks are up to 1000 only.
	Mark signal search mode	Stop on ORT, OTU, OTD, and MRK signals
	MDI mode	Use RS232C to directly carry out remote moves.
	Indexing mode	Indexing points are restricted in the range 1 to 99; INC/ABS; Compensation.
	Point move mode	Points in the range between 1 to 99; INC/ABS.
	Direct value input mode	Pulse, angular coordinates, user defined dimensions
	Mechanical settings mode	Mechanical parameter settings
	Miscellaneous	Jog move, brake signal output, cam positioner signal output, M outputs.
Servo control		I-PD/ P-ID mode of position control, manual/auto-tuning
Acceleration/ Deceleration curve		There are 8 standard cam curves (including trapezoid and modified sinusoidal) and 8 user definable cams.
Monitor outputs		Axis position deviation, axis test move, axis position command value, analog velocity output: $\pm 6V$ maximum.
Safety features		High current, High voltage, Low voltage, Over heating, Overload, Abnormal encoder signals, Over travel signals, abnormal CPU
Power supply		100 - 115 VAC / 200 - 230 VAC 50/60 Hz
Backup Battery		Lithium battery (approximate life : 20000 hours of usage)
Weight		6.5 Kg.

(3) Operating Conditions

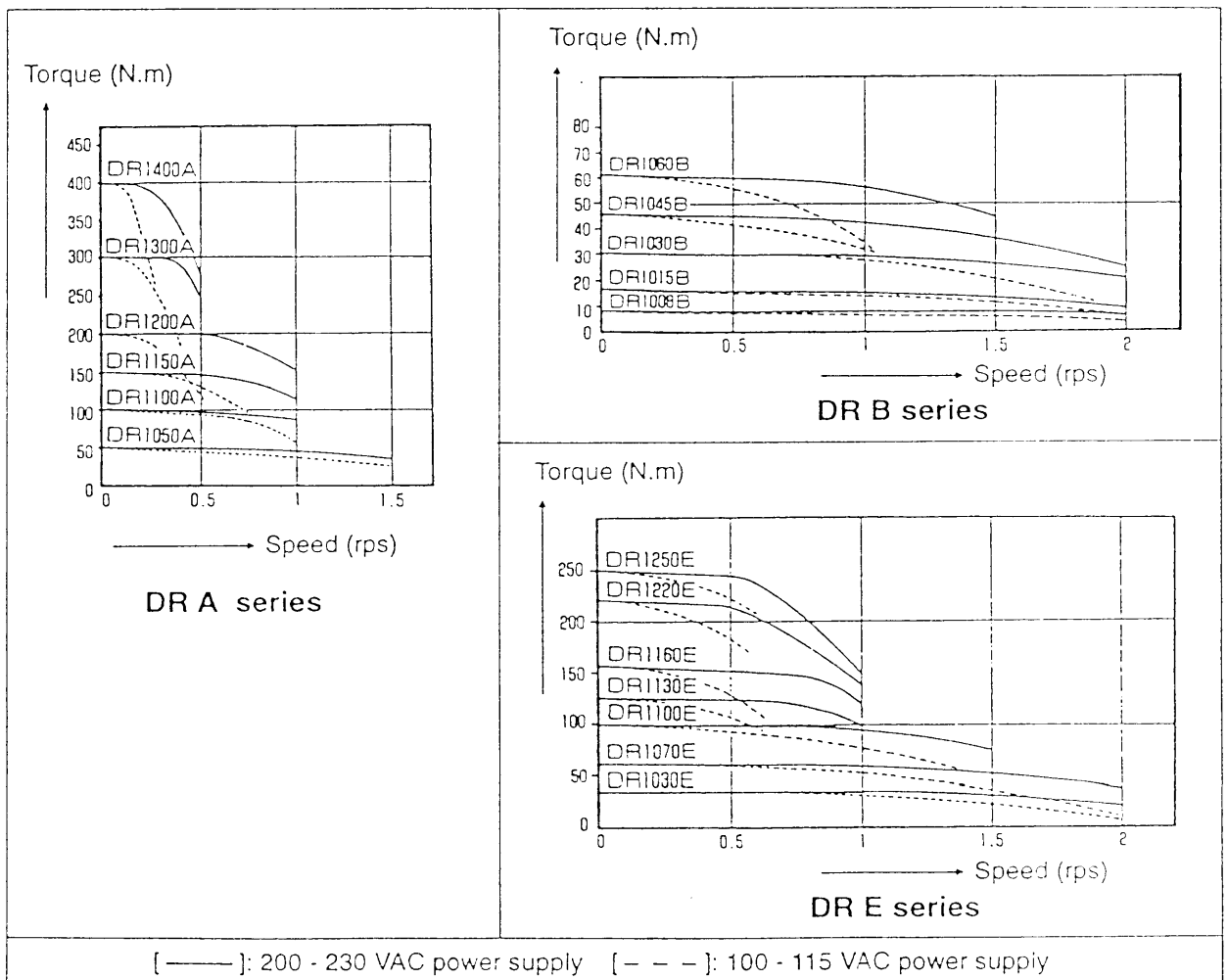
		Motor section	Driver section	Comments
Ambient operating conditions	Temperature	0° to 45° C	0° to 50° C	
	Humidity	20 to 85% RH	20 to 90% RH	Non condensing
Ambient storage conditions	Temperature	-20° to 85° C	-20° to 85° C	
	Humidity	20 to 85% RH	20 to 90% RH	Non condensing
Operating environment		No corrosive gases, dust-free and no oil mist		

10.2 Torque - Speed Characteristics

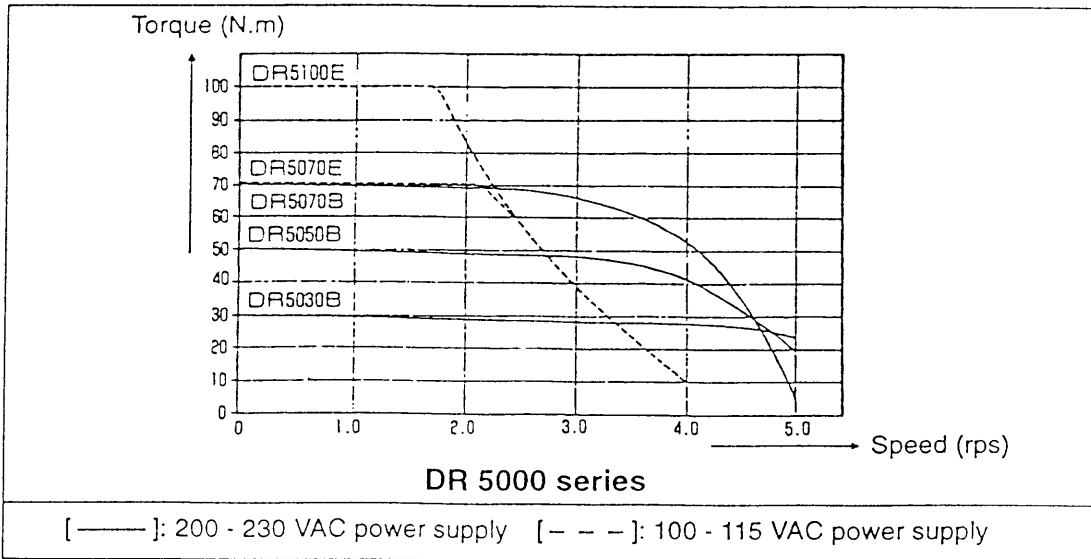
(1) DM series



(2) DR series

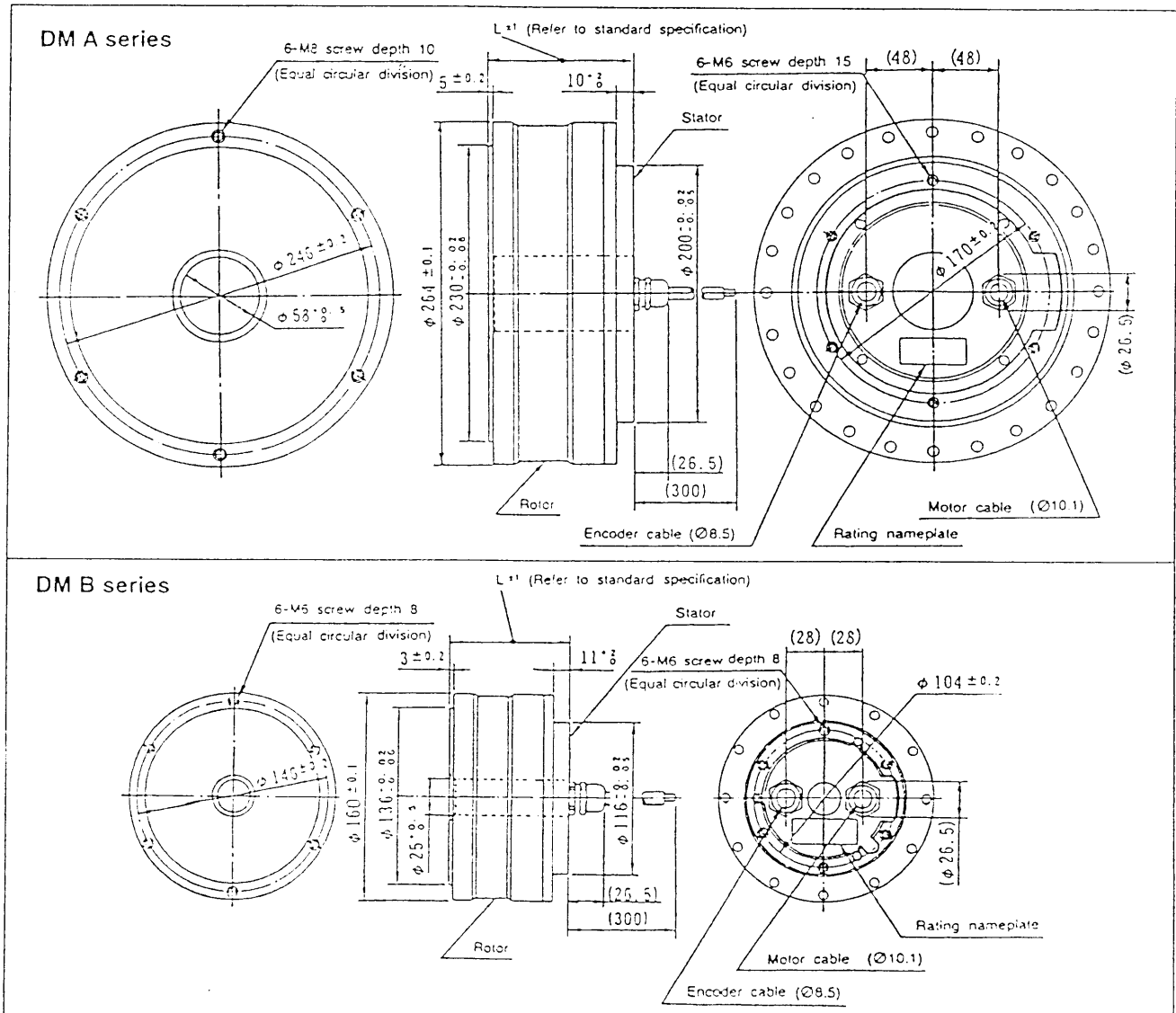


Torque - Speed Characteristics (continued)

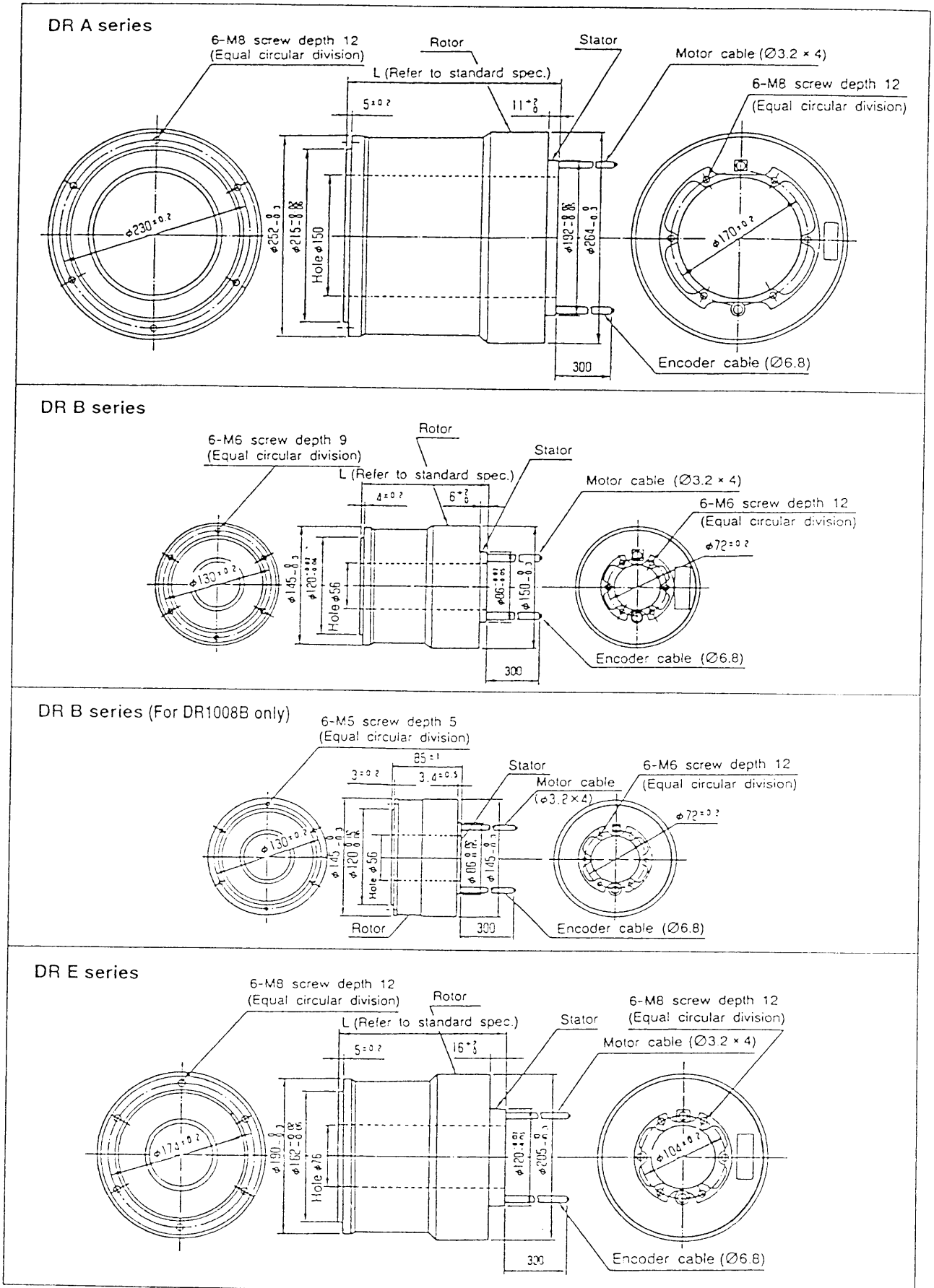


10.3 External Dimensions (Units: mm)

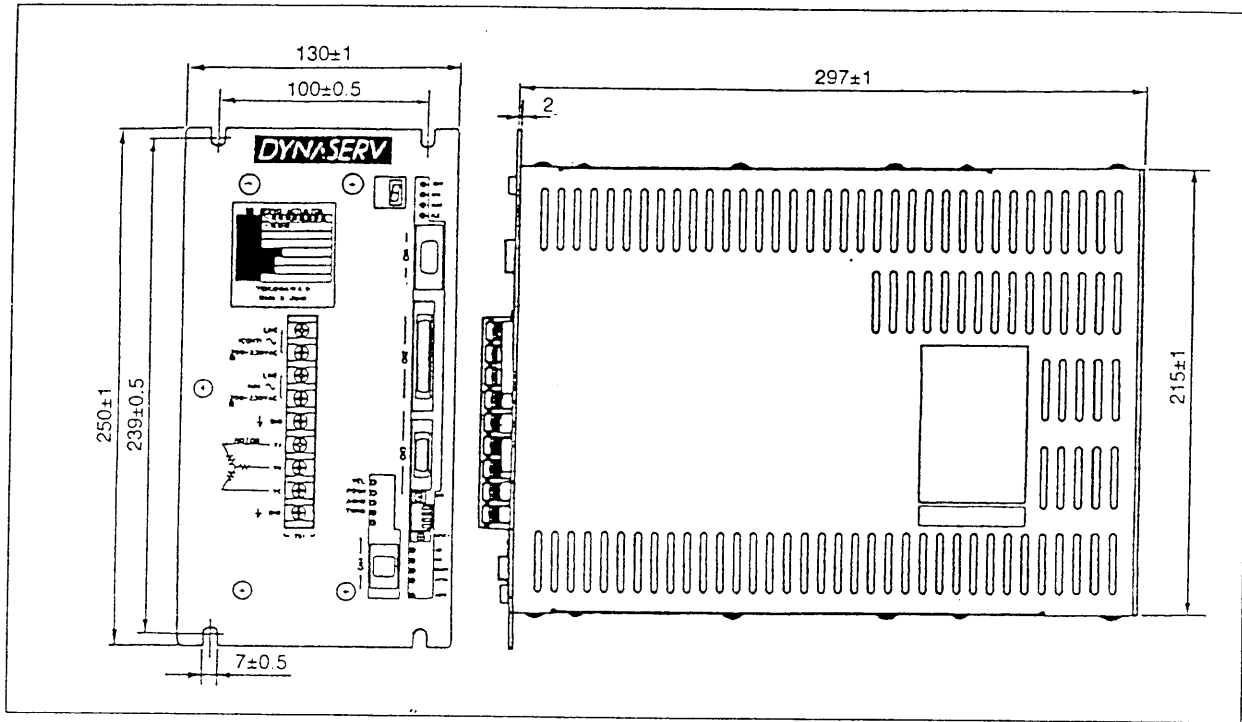
(1) DM series motor



(2) DR series motor



(3) Driver dimensions (common to all series)



10.4 Parameter Listing

P no.	Parameter Description	Minimum value	Maximum value	Default value	Units
1.	Enables the over-travel error function in the + direction	0	1	0	None
2.	Enables the over-travel error function in the - direction	0	1	0	None
3.	Selecting the type of cam profile move	0	1	1	None
4.	Selecting the acceleration type	0	1	0	None
5.	Selecting the deceleration type	0	1	0	None
6.	Selection of the cam profile	1	16	6	None
7.	Acceleration time during a trapezoidal move	1	9999	1000	msec
8.	Deceleration time during a trapezoidal move	1	9999	1000	msec
9.	Feeding Velocity	1	9999999	100000	Axis command units/msec
10.	Jog Velocity	1	9999999	100000	Axis command units/msec
11.	Over travel search velocity during a homing move	1	9999999	100000	Axis command units/msec
12.	Homing operation: Home sensor proximity signal search velocity	1	9999999	50000	Axis command units/msec
13.	Home sensing move 1	1	9999999	25000 (appr)	Axis command units/msec
15.	Homing operation: Origin position offset feed velocity	1	9999999	100000	Axis command units/msec
16.	Velocity override percentage 1	0	200	100	%
17.	Velocity override percentage 2	0	200	100	%
20.	Homing direction	0	1	0	None
21.	Enable/ Disable the overtravel signal under the homing mode.	0	1	0	None
22.	Enable/ Disable the proximity signal search during a homing operation.	0	1	1	None
27.	Enabling the homing flag position error.	0	1	1	None
29.	Offset distance from the Home position	-9999999	9999999	0	Axis command units
30.	Homing complete operation command value	-9999999	9999999	0	Axis command units
31.	Operation width under testing mode	0	9999	1000	Axis command units
32.	Operation width under Auto-tuning	5000	45000	20000	Axis command units
33.	Maximum deceleration under Auto-tuning	10	1000	100	msec
34.	Initializing the deceleration time while under Auto-tuning.	100	2000	500	msec
38.	Servo stiffness settings	1	5	3	None
39.	Signal search direction	0	1	0	None
41.	Enabling the signal search mark signal	0	1	0	None
42.	Enabling the proximity signal during homing	0	1	0	None
43.	Enabling the (+) direction over travel signal during the signal search mode	0	1	0	None
44.	Enabling the (-) direction over travel signal during the signal search mode	0	1	0	None

P no.	Parameter Description	Minimum value	Maximum value	Default value	Units
46.	Signal search mark signal logic settings	0	1	0	None
47.	Logic for the proximity signal during homing	0	1	0	None
48.	Logic for the (+) direction over travel signal during the signal search mode	0	1	0	None
49.	Logic for the (-) direction over travel signal during the signal search mode	0	1	0	None
50.	The position control band width	0	32	12	Hz
53.	The position integral limiting value	0	9999999	10000	Axis command units
54.	The position feed forward percentage	0	126	90	%
55.	Velocity feed forward percentage	0	126	100	%
56.	Acceleration feed forward gain	0	9999999	0	None
58.	Positioning settling width	0	9999	5	Axis command units
65.	Value causing an error detection in the (+) or CW direction:	1	32767	32767	Pulse
66.	Value causing an error detection in the (-) or CCW direction:	-32767	-1	-32767	Pulse
70.	Analog monitor selection	0	8	4	None
71.	Axis positioning error monitoring gain	0	6	2	None
72.	Axis test operation monitoring gain	0	6	2	None
73.	Axis position monitoring gain	0	12	2	None
74.	Axis velocity monitoring gain	0	6	2	None
78.	Feeding move set value	-9999999	9999999	0	Axis command units
79.	Move time during a cam profile selection.	1	9999	2000	msec
80.	Acceleration time during a cam profile selection.	1	9999	1000	msec
81.	Deceleration time during a cam profile selection.	1	9999	1000	msec
82.	Enabling the Program step execution	0	1	0	None
83.	Enabling the Absolute instruction during program execution	0	1	0	None
84.	Enabling the peak velocity during a cam profile move	0	1	0	None
85.	Enable the (+) direction soft limit error	0	1	0	None
86.	Enable the (-) direction soft limit error	0	1	0	None
87.	(+) direction soft limit settings	-9999999	9999999	0	Axis command units
88.	(-) direction soft limit settings	-9999999	9999999	0	Axis command units
89.	Brake turn OFF delay time upon Servo ON	0	2000	0	msec
90.	Advanced Brake turn ON before Servo OFF	0	2000	0	msec
91.	TBX_EMG Servo status	0	2	0	None
92.	Start-up program enable	0	1	0	None
100.	M function enable in program execution	0	1	0	None
101.	M function enable during index point operation	0	1	0	None

P no.	Parameter Description	Minimum value	Maximum value	Default value	Units
102.	Enabling the selection of serial communication type for the M function interface	0	1	0	None
103.	Optional stop enable	0	1	0	None
104.	ABS command selection during Index / point / direct input value type of operations	0	1	0	None
105.	Movement direction options under rotation coordination	0	3	0	None
106.	Settling wait enable	0	1	1	None
108.	Operation units selection	0	2	1	None
109.	Index divisions setting	-1	100	4	None
110.	Point divisions setting	1	100	10	None
150.	Velocity control loop: Proportional gain settings	5	10000	80	0.1 times
152.	First order delay filter: Frequency settings	0	3	0	None
153.	Notch filter: Enable / Disable	0	1	0	None
154.	Notch filter: Frequency selection	50	1500	1500	Hz
155.	Inertia settings	5	200000	0	0.001 Kg.m ²
158.	Torque limiter	0	100	0	%
159.	Velocity control loop band width	1	100	50	Hz
161.	Cam positioner 0_ON	0	9999999	0	Axis command units
162.	Cam positioner 0_OFF	0	9999999	0	Axis command units
163.	Cam positioner 1_ON	0	9999999	0	Axis command units
164.	Cam positioner 1_OFF	0	9999999	0	Axis command units
165.	Auto homing	0	1	0	None
201.	Selection of English / Japanese language display	0	1	0	None
202.	Axis command (+)direction setting	0	1	1	None
204.	Acceleration feed forward logic	0	1	0	None
205.	Axis encoder resolution settings	1000	9999999	※	Pulse/rev
206.	Axis velocity input sensitivity settings	1	9999	※	mV/(rev/sec)
207.	Z signal interval	1	9999999	※	Pulse
208.	Axis command unit selection	0	3	1	None
209.	Axis scaling data (command unit side)	1000	9999999	※	Axis command units
210.	Axis scaling data (pulse side)	1000	9999999	※	Pulse
212.	Straight line coordinate selection	0	1	0	None
213.	Axis maximum velocity	1	9999999	※	Axis command units/msec

NOTE: The ※ indicates that this value is dependant on the motor series and type.

P no.	Parameter Description	Minimum value	Maximum value	Default value	Units
215.	PLC operation: Start signal processing speed selection	0	1	0	None
216.	Servo ON status upon power up during serial communication operations	0	1	1	None
217.	Jog move operation: Serial communication selection	0	1	0	None
218.	Rotor inertia	5	5000	※	0.001 Kg.m ²
219.	Maximum torque	5	10000	※	0.1 N.m
220.	Torque input	1	10000	※	N.m/V

NOTE: The ※ indicates that this value is dependant on the motor series and type.

10.5 Monitor Parameter Listing

M.No.	Monitoring parameter	Units
300	Currently under operation	None
301	Axis is under operation	None
302	Error status	None
303	Alarm status	None
304	Controller ready	None
305	Servo ready	None
306	Drive coordinate status	None
307	M function under operation	None
308	Selection of communication interface for operations	None
310	Display of program number under execution (or last executed)	None
311	Display of block number under execution in the program	None
312	Program nesting counter	None
313	Move dimensions display	None
314	Index resolution current value	None
315	Velocity override selection status	None
316	Program auto-rewind enabled status	None
317	Completion of homing status display	None
318	Homing operation: The measured value	Pulse
320	Axis pulse position command value	Pulse
321	Axis pulse position current value	Pulse
322	Axis pulse position deviation	Pulse
323	Axis command unit command value	Pulse
324	Axis scaling data (command unit side)	Axis command unit
325	Axis scaling data (pulse side)	Pulse
325	Axis under operation: Command value	Axis running unit
328	Axis position settling status	None
329	Axis positioning status	None
330	Display brake turned OFF	None
331	Cam positioner 0 status	None
332	Cam positioner 1 status	None