P5
Servomotors

Capacity
30 to 1,000W(13 types)

Features
High rigidity

Faster servos

Maximum rotating speed of 4,500min^{-1} for quicker positioning.

Uses
Robots

Machines with windings

Machines for industrial industries

Common specifications

Time rating	Continuous
Insulation grade	F type
Dielectric strength	1,500 VAC, 1 minute
Insulation grade	500 VDC, 10 M or more
Protection system	Fully closed, self-cooling
	P50B03,04 : IP40
	P50B05,07,08 : IP55
Presence/lack of seal	P50B03,04 : No
	P50B05,07,08 : Yes
Ambient temperature	0 to 40
Storage temperature	20 to 65
Ambient humidity	20 to 90% (non-condensing)
Vibration grade	V15
Paint color	Munsell N1.5 or equivalent (circumference)
Excitation system	Permanent magnet
Installation method	Flange type

Standard specifications
200 VAC type

Motor model (wiring-saving INC, w/o brake); < > dimensions of flange angle				P50B03003DXS	P50B04006DXS
Sq. flange size in	Condition	Symbol	Unit	35	42
Rated output		P_R	W	30	60
Rated rotating speed		N_R	min ^{1}	3,000	
Maximum rotating speed		Nmax	min ^{1}	4,500	
Rated torque		T_R	N m	0.098	0.191
Continuous stall torque		T_S	N m	0.108	0.216
Instantaneous maximum stall torque		T_P	N m	0.323	0.647
Rated armature current		I_R	Arms	0.5	0.7
Continuous stall armature current		I_S	Arms	0.53	0.76
Instantaneous maximum stall armature current		I_P	Arms	1.8	2.7
Torque constant		K_T	N m/Arms	0.206	0.304
Induced voltage constant		K_E	mV/min ^{1}	7.2 10%	10.6 10%
Phase armature resistance		R		20.5	10.4
Rated power rate		Q_R	kW/S	6.5	7.5
Electric time constant		te	ms	0.7	1.4
Mechanical time constant (w/o sensor)		tm	ms	2.1	1.6
Rotor inertia (INC)		J_M	kg m^2 GD^2/4	0.0197 10 ^{4}	0.054 10 ^{4}
Rotor inertia (ABS-RII / RIII)		J_M	kg m^2 GD^2/4	0.0167 10 ^{4}	0.051 10 ^{4}
Detector wiring-saving INC			P/R	2,000	
Detector ABS-RII / RIII			P/R	8,192	
Mass including wiring-saving INC		W_E	kg	0.24	0.46
Brake holding torque		T_B	N m	0.098	0.191
Brake excitation voltage		V_B	V	90 24	
Brake excitation current		I_B	A	0.07 0.25	0.07 0.26
Brake inertia		J_B	kg m^2 GD^2/4	0.0021 10 ^{4}	0.0078 10 ^{4}
Brake mass		W	kg	0.15	0.24
Motor operating temperature and humidity				Temperature: 0 to 40 , humidity: 90% or less (non-condensing)	

Applicable amplifier model		PU0A015- PZ0A015-	
Amplifier power supply		200 to 230V AC 10% 15% 50/60Hz 3Hz 3-phase	
Amplifier operating temperature and humidity		Temperature: 0 to 55 , humidity: 90% or less (non-condensing)	
Power capacity (at rating)	kVA	0.2	0.3
Amplifier mass	kg	2.2	

Motor model (wiring-saving INC, w/o brake); < > dimensions of flange angle				P50B07040DXS	P50B08050DXS
Sq. flange size in	Condition	Symbol	Unit	76	86
Rated output		P_R	W	400	500
Rated rotating speed		N_R	min ^{1}	3,000	
Maximum rotating speed		Nmax	min ^{1}	4,500	
Rated torque		T_R	N m	1.274	1.589
Continuous stall torque		T_S	N m	1.372	1.96
Instantaneous maximum stall torque		T_P	N m	3.92	5.88
Rated armature current		I_R	Arms	3.0	3.9
Continuous stall armature current		I_S	Arms	3.1	4.5
Instantaneous maximum stall armature current		I_P	Arms	10.0	15.0
Torque constant		K_T	N m/Arms	0.481	0.473
Induced voltage constant		K_E	mV/min ^{1}	16.8 10%	16.5 10%
Phase armature resistance		R		1.65	0.94
Rated power rate		Q_R	kW/S	22.1	21.8
Electric time constant		te	ms	4.0	5.2
Mechanical time constant (w/o sensor)		tm	ms	1.6	1.5
Rotor inertia (INC)		J_M	kg m^2 GD^2/4	0.74 10 ^{4}	1.161 10 ^{4}
Rotor inertia (ABS-RII / RIII)		J_M	kg m^2 GD^2/4	0.752 10 ^{4}	1.173 10 ^{4}
Detector wiring-saving INC			P/R	2,000	
Detector ABS-RII / RIII			P/R	8,192	
Mass including wiring-saving INC		W_E	kg	2.1	3.0
Brake holding torque		T_B	N m	0.98	1.96
Brake excitation voltage		V_B	V	90 24	
Brake excitation current		I_B	A	0.08 0.3	0.08 0.33
Brake inertia		J_B	kg m^2 GD^2/4	0.245 10 ^{4}	0.343 10 ^{4}
Brake mass		W	kg	0.57	0.8
Motor operating temperature and humidity				Temperature: 0 to 40 , humidity: 90% or less (non-condensing)	

Applicable amplifier model		PU0A030- PZ0A030-	
Amplifier power supply		200 to 230V AC 10% 15% 50/60Hz 3Hz 3-phase	
Amplifier operating temperature and humidity		Temperature: 0 to 55 , humidity: 90% or less (non-condensing)	
Power capacity (at rating)	kVA	1.3	1.5
Amplifier mass	kg	2.2	

Notes:1. means a combination with a standard amplifier after the temperature rises and gets saturated. The values are typical.
2. means values when the windings are at 20 . The values are typical.

	P50B04010DXS 42	P50B05005DXS 54	P50B05010DXS 54	P50B05020DXS 54	P50B07020DXS 76	P50B07030DXS 76	Symbol
	100	50	100	200	200	300	P_R
	3,000						N_R
	4,500						Nmax
	0.319	0.159	0.319	0.637	0.637	0.931	T_R
	0.353	0.167	0.353	0.686	0.686	0.98	T_S
	0.98	0.49	0.98	1.96	1.96	2.94	T_P
	1.0	0.85	1.1	1.6	2.2		I_R
	1.2	0.85	1.2	1.7	2.3	2.2	I_S
	3.6	2.9	3.7	5.5	7.4	7.5	I_P
	0.333	0.249	0.319	0.436	0.348	0.483	K_T
	11.6 10%	8.7 10%	11.1 10%	15.2 10%	12.15 10	16.86 10	K_E
	7.0	9.2	4.9	3.4	2.5	2.9	R
	13.8	4.4	10.6	24.2	10.6	17.7	Q_R
	1.5	2.1	2.5	2.9	3.6	3.8	te
	1.4	2.6	1.4	0.9	2.4	1.8	tm
	0.079 10 $^{-4}$	0.063 10 $^{-4}$	0.101 10 $^{-4}$	0.173 10 $^{-4}$	0.386 10 $^{-4}$	0.495 10 $^{-4}$	J_M
	0.076 10 $^{-4}$	0.06 10 $^{-4}$	0.098 10 $^{-4}$	0.17 10 $^{-4}$	0.398 10 $^{-4}$	0.507 10 $^{-4}$	J_M
	2,000						
	8,192						
	0.59	0.53	0.74	1.07	1.57	1.71	W_E
	0.319	0.167	0.353	0.353	0.69	0.98	T_B
	90 24						V_B
	0.07 0.26	0.11 0.4			0.08 0.3		I_B
	0.0078 10 $^{-4}$	0.029 10 $^{-4}$			0.245 10 $^{-4}$		J_B
	0.24	0.3			0.57		W
	Temperature: 0 to 40 , humidity: 90% or less (non-condensing)						

	PU0A015- PZ0A015-					
	200 to 230V AC 10% 15% 50/60Hz 3Hz 3-phase					
	Temperature: 0 to 55 , humidity: 90% or less (non-condensing)					
	0.4	0.3	0.4	0.8	1.0	
	2.2					

	P50B08075DXS 86	P50B08100DXS 86	Symbol
	750	1,000	P_R
	3,000		N_R
	4,500		Nmax
	2.381	3.185	T_R
	2.94	3.92	T_S
	8.82	11.76	T_P
	6.0	6.7	I_R
	7.1	7.5	I_S
	23.7	25.7	I_P
	0.447	0.553	K_T
	15.6 10%	19.3 10%	K_E
	0.43	0.41	R
	29.5	38.3	Q_R
	5.8	5.9	te
	1.2	1.1	tm
	1.926 10 $^{-4}$	2.651 10 $^{-4}$	J_M
	1.938 10 $^{-4}$	2.663 10 $^{-4}$	J_M
	2,000		
	8,192		
	3.9	5.05	W_E
	2.94		T_B
	90 24		V_B
	0.08 0.33		I_B
	0.343 10 $^{-4}$		J_B
	0.8		W
	Temperature: 0 to 40 , humidity: 90% or less (non-condensing)		

	PZ0A050-	
	200 to 230V AC 10% 15% 50/60Hz 3Hz 3-phase	
	Temperature: 0 to 55 , humidity: 90% or less (non-condensing)	
	2.0	2.5
	5.2	

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Servomotors

Standard specifications
200 VAC type

Motor model (wiring-saving INC, w/o brake); < > dimensions of flange angle				P50B03003PXS	P50B04006PXS	P50B04010PXS	P50B05005PXS
Sq. flange size in	Condition	Symbol	Unit	35	42	42	54
Rated output		P_R	W	30	60	100	50
Rated rotating speed		N_R	min [1]	3,000			
Maximum rotating speed		Nmax	min [1]	4,500			
Rated torque		T_R	N m	0.098	0.191	0.319	0.159
Instantaneous maximum stall torque		T_P	N m	0.322	0.647	0.98	0.49
Rated armature current		I_R	Arms	1.0	1.3	1.8	1.6
Instantaneous maximum stall armature current		I_P	Arms	3.6	5.0	6.0	5.0
Torque constant		K_T	N m/Arms	0.108	0.164	0.195	0.136
Induced voltage constant		K_E	mV/min [1]	3.79 10	5.74 10	6.8 10	4.76 10
Phase armature resistance		R		5.4	2.95	2.35	2.6
Rated power rate		Q_R	kW/S	6.5	7.5	13.8	4.4
Electric time constant		te	ms	0.7	1.5	1.6	2.2
Mechanical time constant (w/o sensor)		tm	ms	2.0	1.5	1.3	2.4
Applicable load inertia		J_L	kg m² GD²/4	0.197 10^{-4}	0.54 10^{-4}	0.79 10^{-4}	0.63 10^{-4}
Detector wiring-saving INC			P/R	2,000			
Inertia (including wiring-saving INC)		J_M	kg m² GD²/4	0.02 10^{-4}	0.054 10^{-4}	0.079 10^{-4}	0.063 10^{-4}
Mass including wiring-saving INC		W_E	kg	0.24	0.46	0.59	0.53
Detector ABS-RII			P/R	8,192			
Inertia (including ABS-RII)		J_M	kg m² GD²/4	0.167 10^{-4}	0.051 10^{-4}	0.076 10^{-4}	0.06 10^{-4}
Mass including ABS-RII		W_E	kg	0.31	0.52	0.65	0.61
Brake holding torque		T_B	N m	0.098	0.191	0.319	0.167
Brake excitation voltage		V_B	V	90/24			
Brake excitation current		I_B	A	0.07/0.25	0.07/0.26		0.11/0.4
Brake inertia		J_B	kg m² GD²/4	0.0021 10^{-4}	0.0078 10^{-4}		0.029 10^{-4}
Brake mass		W	kg	0.15	0.24		0.3
Motor operating temperature and humidity				Temperature: 0 to 40 , humidity: 90% or less (non-condensing)			

Applicable amplifier model			**PU0B015-**			
Amplifier power supply			200 to 230V AC 10% 15% 50/60Hz 3Hz 3-phase			
Amplifier operating temperature and humidity			Temperature: 0 to 40 , humidity: 90% or less (non-condensing)			
Power capacity (at rating)		kVA	0.2	0.3	0.2	0.2
Amplifier mass		kg	0.85			

Notes:1. means a combination with a standard amplifier after the temperature rises and gets saturated. The values are typical.
2. means values when the windings are at 20 . The values are typical.
3. The constants are those measured when the motor is mounted on an aluminum plate 305 x 305 x 12mm thick.

	P50B05010PXS 54	P50B05020PXS 54	P50B07020PXS 76	Symbol
	100	200		P_R
	3,000			N_R
	4,500			Nmax
	0.319	0.637		T_R
	0.98	1.96	1.96	T_S
	2.1	3.4	4.3	I_R
	6.7	11	14.4	I_P
	0.176	0.218	0.18	K_T
	6.25 10	7.6 10	6.3 10	K_E
	1.5	0.85	0.66	R
	10.6	24.2	10.6	Q_R
	2.6	2.8	3.6	te
	1.4	0.9	2.3	tm
	1.01 10^{-4}	1.73 10^{-4}	3.86 10^{-4}	J_L
	2,000			
	0.101 10^{-4}	0.173 10^{-4}	0.386 10^{-4}	J_M
	0.74	1.07	1.57	W_E
	8,192			
	0.098 10^{-4}	0.17 10^{-4}	0.398 10^{-4}	J_M
	0.82	1.15	1.61	W_E
	0.353		0.69	T_B
	90/24			V_B
	0.11/0.4		0.08/0.3	I_B
	0.029 10^{-4}		0.245 10^{-4}	J_B
	0.3		0.57	W
	Temperature: 0 to 40 , humidity: 90% or less (non-condensing)			

	PU0B015-	PU0B030-		
	200 to 230V AC 10% 15% 50/60Hz 3Hz 3-phase			
	Temperature: 0 to 40 , humidity: 90% or less (non-condensing)			
	0.3	0.5	0.6	
	0.85	1.1		

Planetary gears

Model	Motor output	Reduction ratio	Backlash	Efficiency	Rated torque	Instantaneous maximum torque	Rated rotating speed	Dimensions
	W		Minute		N m	N m	min-1	mm
P50B05010DXS A	100	1/3	30	75	0.72	2.2	1,000	54 54mm
P50B05010DXS B		1/5		80	1.3	3.9	600	
P50B05010DXS C		1/9	42		2.3	7.1	333	
P50B05010DXS D		1/15			3.8	11.8	200	
P50B05005DXS E	50	1/25		70	2.9	8.9	120	
P50B07040DXS A	400	1/3	24	75	2.9	8.9	1,000	78 78mm
P50B07040DXS B		1/5			4.8	14.8	600	
P50B07040DXS C		1/9	30		8.5	26.3	333	
P50B07040DXS D		1/15			14.3	44.1	200	
P50B07030DXS E	300	1/25			17.4	55.1	120	
P50B08075DXS A	750	1/3	24		5.4	19.8	1,000	
P50B08075DXS B		1/5			8.9	33.1	600	
P50B08075DXS C		1/9	30	70	15.0	55.5	333	98 98mm
P50B08075DXS D		1/15			25.0	92.2	200	

Flat gears

Model	Motor output	Reduction ratio	Backlash	Efficiency	Rated torque	Instantaneous maximum torque	Rated rotating speed	Dimensions
	W		Minute		N m	N m	min-1	mm
P50B04006DXS J	60	1/5	60	95	0.9	1.8	600	60 60mm
P50B04006DXS K		1/10		90	1.7	3.4	300	
P50B04006DXS L		1/15			2.6	5.2	200	
P50B05020DXS J	200	1/5		95	3.0	6.0	600	82 82mm
P50B05020DXS K		1/10		90	5.7	11.4	300	
P50B05010DXS L	100	1/15			4.3	8.6	200	
P50B07040DXS J	400	1/5		95	6.0	12.0	600	102 102mm
P50B07040DXS K		1/10		90	11.5	23.0	300	
P50B07030DXS L	300	1/15			12.6	25.2	200	
P50B08075DXS J	750	1/5		80	9.5	19.0	600	120 120mm
P50B08075DXS K		1/10			19.0	38.0	300	
P50B08050DXS L	500	1/15		90	21.5	43.0	200	

Note: To protect the gears, limit the torques to double their ratings.
Amplifiers can be delivered with different internal settings if you specify them when placing an order.

Backlash-less planetary gears

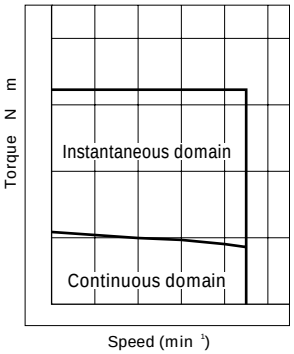
Model	Motor output	Reduction ratio	Backlash	Efficiency	Rated torque	Instantaneous maximum torque	Rated rotating speed	Dimensions
	W		Minute		N m	N m	min-1	mm
P50B05010DXS S	100	1/5	2	75	1.2	3.7	600	70 70mm
P50B05010DXS T		1/11	3	80	2.8	8.6	273	
P50B05005DXS U	50	1/21			2.7	8.2	143	
P50B05005DXS V		1/33			4.2	12.9	91	
P50B07040DXS S	400	1/5	2	75	4.8	14.7	600	90 90mm
P50B07040DXS T		1/11	3		10.5	32.3	273	105 105mm
P50B07030DXS U	300	1/21			14.7	46.3	143	
P50B07020DXS V	200	1/33			15.8	48.5	91	
P50B08075DXS S	750	1/5	2	70	8.3	30.9	600	
P50B08075DXS T		1/11	3		18.3	72.8	273	120 120mm
P50B08050DXS U	500	1/21			25.0	92.6	143	


IP40
IP55
Optional
IP55
PU
PZ
PE
PV
C Z
TÜV

P5
Servomotors

"P5" + "PZ" system: characteristics of torque versus rotating speed

200 VAC type



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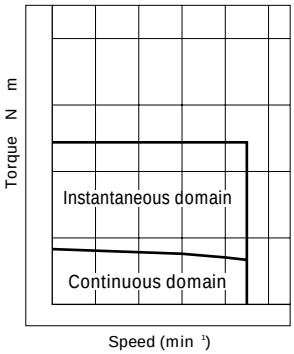

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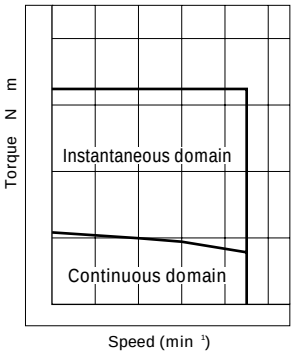

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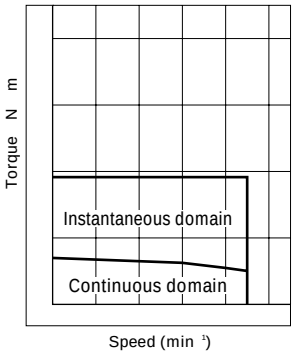

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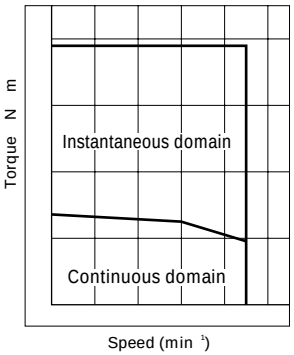
P50B05010D 100W



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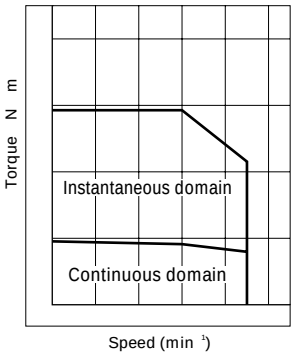

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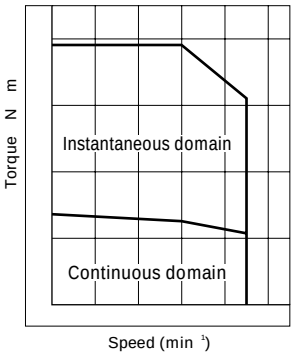

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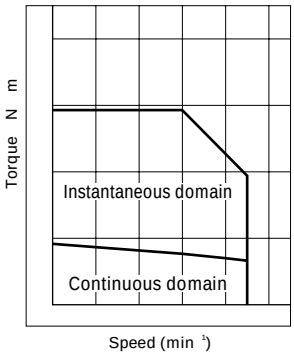

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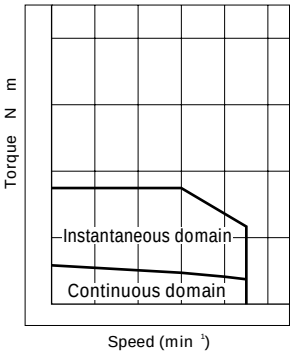

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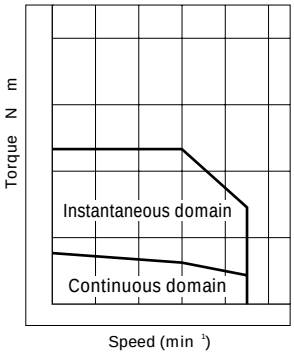
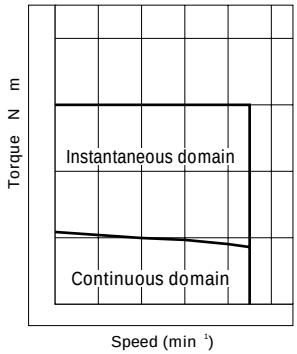


P50B08100D 1000W

"P5" + "PU" system: characteristics of torque versus rotating speed

100 VAC type



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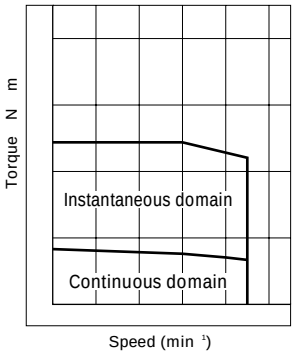

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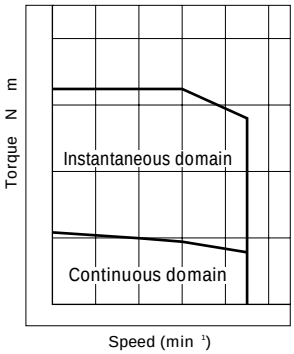
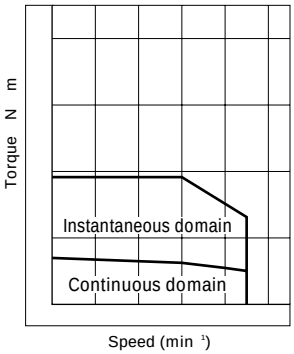
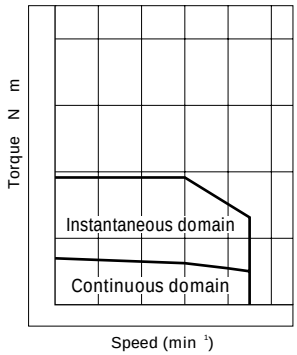


P50B04006P 60W



P50B04010P 100W



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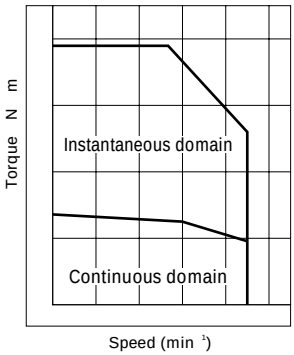
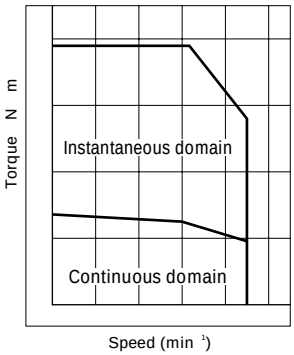
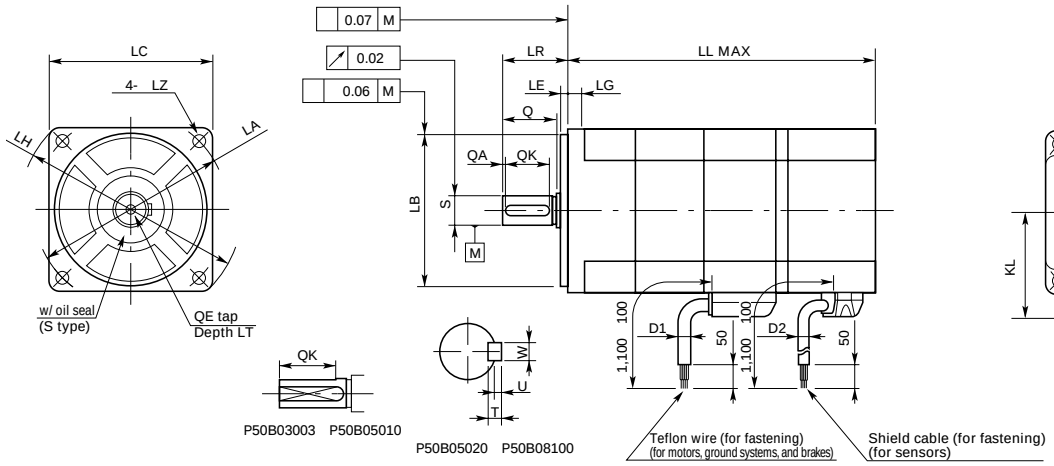


P50B05020P 200W



P50B07020P 200W

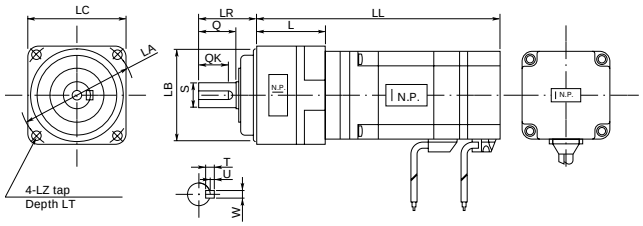
Dimensions unit:mm



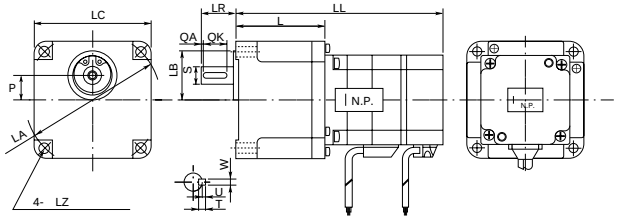
MODEL	Incremental w/o brake LL	Incremental w/ brake LL	ABS-R w/o brake LL	ABS-R w/ brake LL	LG	KL	LA	LB	LE	LH	LC	LZ	LR	S	Q	QA	QK	W	T	U	QE	LT	D1	Increm ental D2	ABS -R D2	Oil seal
P50B03003	67.5	98	87	117	4.5	27.5	40	30 $^{0}_{-0.021}$	2	47	35	3.5	15	5 $^{0}_{-0.008}$			11	With 2 slots 4.5	0.2				6			
P50B04006	82	114	100	132	5	31	48	34 $^{0}_{-0.025}$	2	57	42	3.5	24	7 $^{0}_{-0.009}$	20		15	With 2 slots 6.5	0.2						5.1	No
P50B04010	95	127	113	145																						
P50B05005	76	105	95.5	124.5	5	38	60	50 $^{0}_{-0.025}$	2.5	71.5	54	4.5	24	8 $^{0}_{-0.009}$	20		15	With 2 slots 7.5	0.2	M3	8					
P50B05010	86	115	105.5	134.5																						
P50B05020	105	134	124.5	153.5									30	11 $^{0}_{-0.011}$	25	2	20	4	4	1.5	M4	10		4.7		
P50B07020	97	124	102	129	8	50	90	70 $^{0}_{-0.030}$	3	102.5	76	5.5	30	14 $^{0}_{-0.011}$	25	2	20	5	5	2	M5	12	6.7		7.9	Yes
P50B07030	103	130	108	135																						
P50B07040	113	140	118	145																						
P50B08050	126	166	131	171	8	55	100	80 $^{0}_{-0.030}$	3	115	86	6.6	35	16 $^{0}_{-0.011}$	30	2	25	5	5	2	M5	12				
P50B08075	149	189	154	194																						
P50B08100	172	212	177	217																						

Note: ABS-E and ABS-RIII come with sensors having different dimensions.

Planetary gears



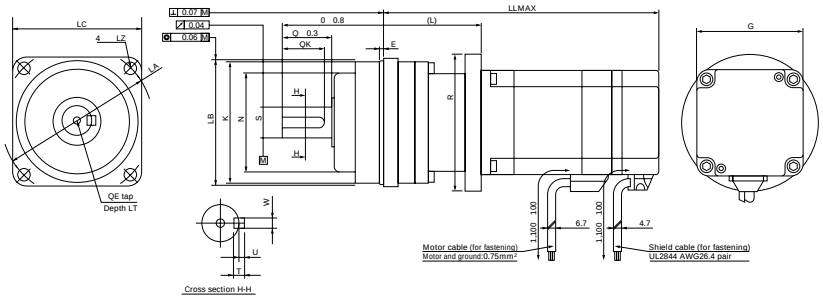
Flat gears



Flat gears	LL mm	L mm	LA mm	LB mm	LC mm	S mm	LR mm	Q mm	LZ mm	LT mm	QK mm	W mm	T mm	U mm	Mass of gear only Kg
P50B05010DXS A	129	43	60	50	54	12	32	20	M5	10	16	4	4	1.5	0.5
P50B05010DXS B															
P50B05010DXS C	144	58													0.65
P50B05010DXS D															
P50B05005DXS E	134														
P50B07040DXS A	173	60	90	70	78	19	50	30	M6	12	22	6	6	2.5	1.85
P50B07040DXS B															
P50B07040DXS C	193	80													2.3
P50B07040DXS D															
P50B07030DXS E	183														
P50B08075DXS A	209	60													1.85
P50B08075DXS B															
P50B08075DXS C	243	94	115	90	96	24	61	40	M8	16	30	8	7	3	3.5
P50B08075DXS D															

Flat gears	LL mm	L mm	LA mm	LB mm	LC mm	S mm	LR mm	LZ mm	LT mm	QK mm	QA mm	W mm	T mm	U mm	Mass of gear only Kg
P50B04006DXS J	129	47	70	18	60	8	32	4.5	6	12	2	3	3	1.5	0.4
P50B04006DXS K															
P50B04006DXS L															0.7
P50B05020DXS J	156	51	94	44	82	12	26.5	6.6	8	16	2	4	4		
P50B05020DXS K															
P50B05010DXS L	137														
P50B07040DXS J	191	78	120	40	102	15	32	6.5	10	20	2	5	5	2	1.3
P50B07040DXS K															
P50B07030DXS L	181														
P50B08075DXS J	229	80	146	50	120	19	35	9	12	25	2	6	6	2.5	1.5
P50B08075DXS K															
P50B08050DXS L	206														

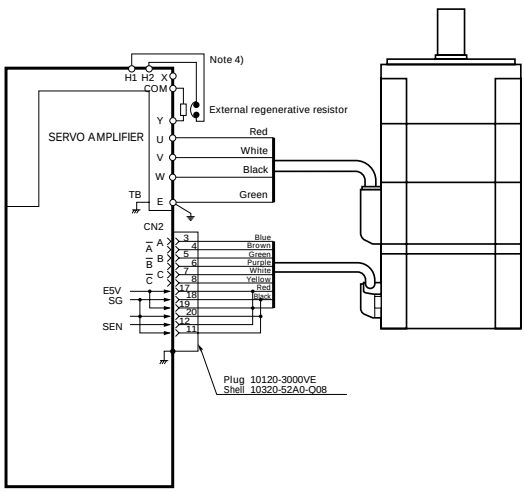
Backlash-less planetary gears



Backlash-less planetary gear	LL	L	LA	LB	E	LC	LR	G	S	QK	Q	K	N	R	LZ	QE	LT	KL	W	T	U	Mass
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Kg
P50B05010DXS S	136	50	80	65	8	70	60	54	16	25	28	64.5	50	72	6.6	M4	8	38	5	5	2	0.8
P50B05010DXS T	145	59																				
P50B05005DXS U	135																					
P50B05005DXS V																						
P50B07040DXS S	174	61	105	85	10	90	74	76	20	32	36	83	60	104	9	M5	10	50	6	6	2.5	1.6
P50B07040DXS T	193	80	120	100	12	105	84		25	36	42	96	70			M6	12		8	7	3	2.4
P50B07030DXS U	183																					
P50B07020DXS V	177																					
P50B08075DXS S	217	68	120	100	12	105	84	86	25	36	42	96	70	116	9	M6	12	55	8	7	3	2.4
P50B08075DXS T	237	88	135	115	14	120	105		32	50	58	112	90	120	11	M8	16		10	8		3.9
P50B08050DXS U	214																					

External connection diagram for “P5”

Incremental encoder



Absolute sensor (ABS-R)