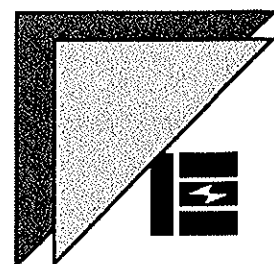
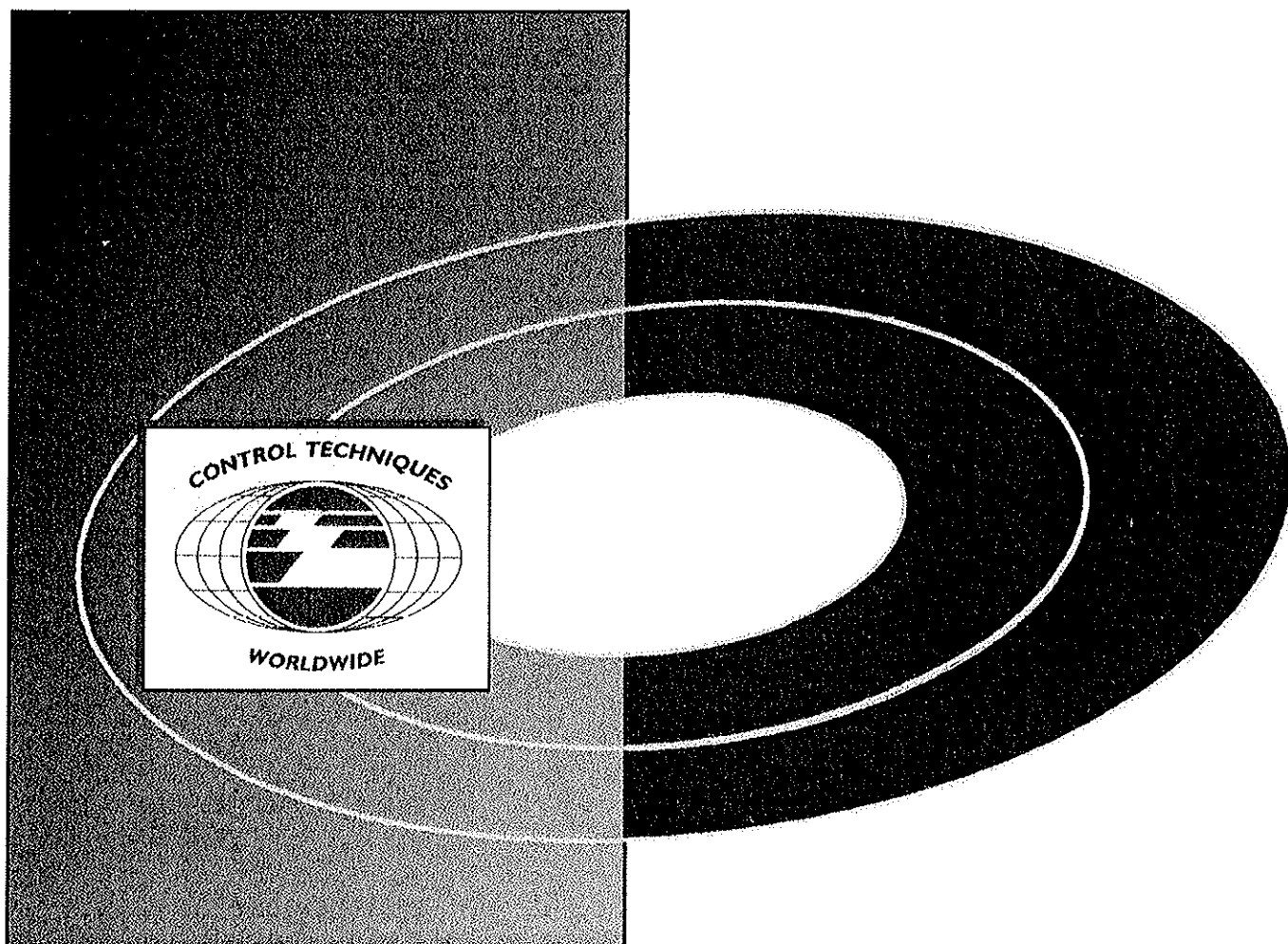
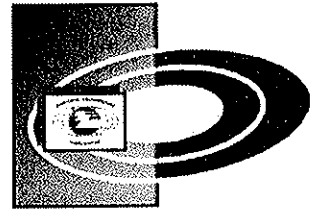


Control Techniques Dynamics

**DutyMax DU
Brushless AC Servo Motors
Performance Information**



DUTYMAX DU BRUSHLESS SERVO MOTORS



Characteristics

The DutymAx DU servo motors have excellent power to size ratio giving optimal dynamic response.

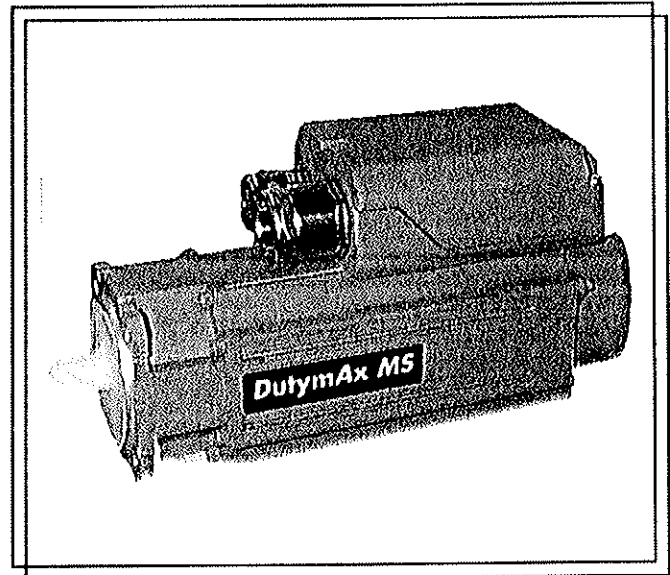
This is provided by:

Superior design of the magnetic circuit within the motor

- Use of powerful rare earth magnets
- Choice of low or high inertia laminated rotor
- The specially constructed high slot-fill stator for 380/480V 3 phase drives

Brushless electronic commutation is achieved by an incremental encoder for high precision feedback integral commutation. This ensures high reliability and system compatibility.

- Available in five frame sizes: 75, 95, 115, 142 and 190 (mm square body)



- Continuous torque from 1.1 Nm to 40.8 Nm (up to 8.5kW)
- Standard base speed 2,000 rpm with 3,000, 4,000 and 6,000 rpm options

Design Features

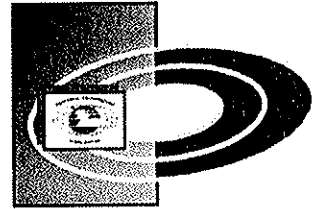
- Modular rotor design
- Rotor assembly balanced to ISO 1940 grade 6.3
- Class H insulation
- High thermal dissipation
- Rugged preloaded bearing system
- Front shaft lip seal - up to 3,000 rpm
- Motor IP enclosure class IP65 up to 3,000 rpm (with mating connector)
- Encoder commutation for high precision feedback
- Fail-safe brake option - no increase in length

Design Benefits

- High performance to size and weight ratio
- IP65 without additional cost
- Cost effective connector options for motor and encoder using terminals and plugs respectively
- Retro-fittable fail-safe brake
- Electrical characteristics optimised for Control Techniques Unidrive
- Terminal boxes may be orientated at 90° angles (as special option)
- Modular design

DUTYMAX DU BRUSHLESS SERVO MOTORS

Technical Specification



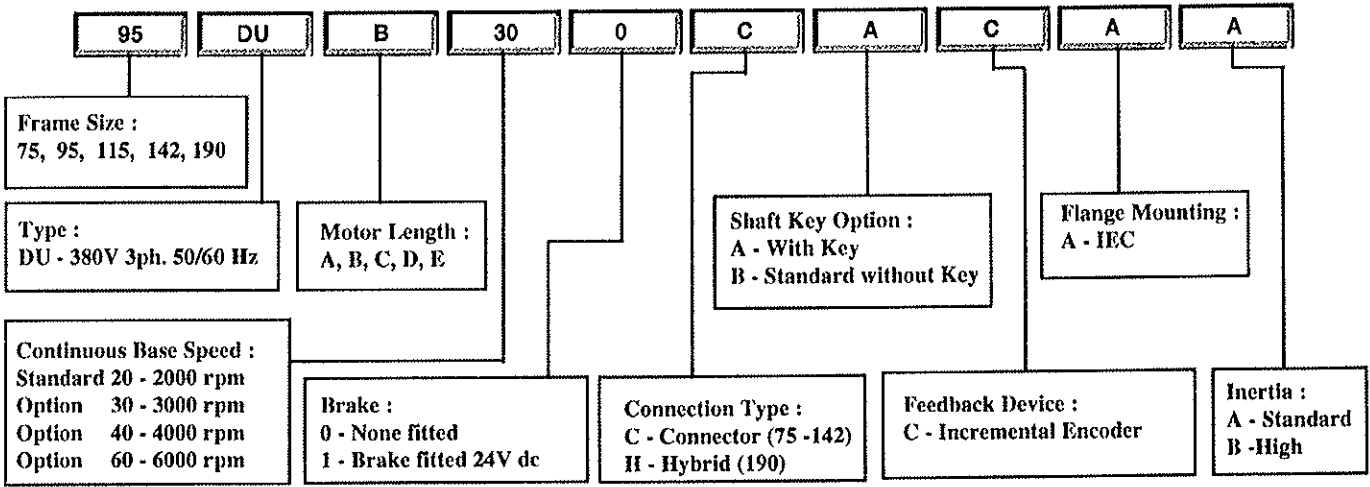
Physical Characteristics

Insulation class	Class H BS EN 60034-1
Dimensional Accuracy	IEC 72-1 normal class (precision class is optional)
Degree of Balance	Rotor balanced to ISO 1940 (BS 6861) G 6.3 (half key convention ISO 8821)
Temperature Monitoring	PTC Thermistor, 160°C switch temperature
Bearing System	Preloaded ball bearings
Electrical Connections	Separate connectors or input glands for Motor, Encoder & Thermistor and Brake
Flange Mounting	IEC 72-1 as standard
Output Shaft	IEC 72-1, Key and Keyway to BS 4235 pt 1

Environmental Characteristics

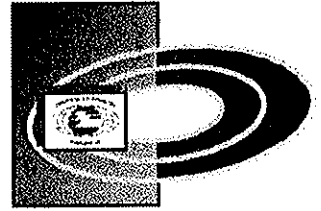
Ingress Protection	RPM up to 3000 : IP65 RPM above 3000 : IP54, IP 65 optional
Operating Temperature	Specified performance at 25°C ambient.

Ordering Information

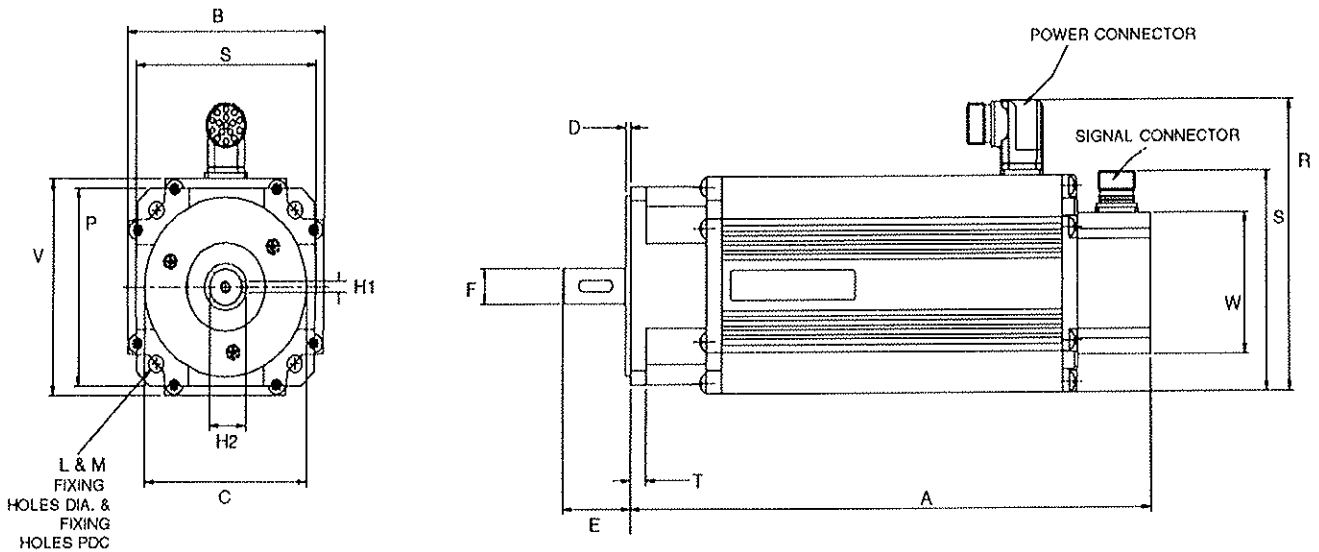


DUTYMAX BRUSHLESS SERVO MOTORS

Outline Drawings & dimensions



Outline Drawings



DutyMax Dimensions

FRAME SIZE:		76DU				95DU					116DU					142DU					190DU			
Dimension / Length suffix *		A	B	C	D	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D
A	Body Length (max)	235	264	293	322	245	274	303	332	361	255	284	313	342	371	284	313	342	371	400	338	392	446	500
B	Body Square	75.5				95.5					115.5					143.0					190.0			
C	Register dia	59.993 / 60.012				79.993 / 80.012					94.991 / 95.013					129.989 / 130.014					179.989 / 180.014			
D	Register Length	2.5				3.0					3.0					3.5					4.0			
E	Shaft Length (front)	23.0	30.0			30.0	40.0				40.0		50.0			50.0					58.0			
F	Shaft dia (front)	11.0	14.0			14.0	19.0				19.0		24.0			24.0					32.0			
H1	Shaft key width	4.0	5.0			5.0	6.0				6.0		8.0			8.0					10.0			
H2	Shaft key height	12.5	16.0			16.0	21.5				21.5		27.0			27.0					35.0			
L	Fixing holes dia. (max)	6.10				7.36					10.36					12.43					14.93			
M	Fixing hole p.d.c.	75.0				100.0					115.0					165.0					215.0			
P	Flange square	70.0 / 70.5				92.0 / 92.5					105.0 / 105.5					142.0 / 143.0					190.0			
T	Flange thickness	5.8 / 6.2				5.8 / 6.2					8.8 / 9.2					10.8 / 11.2					13.9 / 14.1			
W	End cover width	75.0				75.0					75.0					75.0					128.2			
R	Power connector height	120.0				140.0					160.0					185.0					250.0			
S	Signal connector height	100.0				110.0					120.0					135.0					182.0			

DUTYMAX DU BRUSHLESS SERVO MOTOR PERFORMANCE DATA

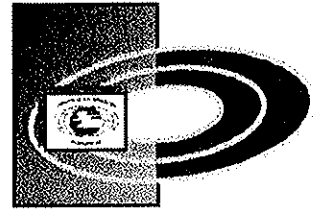
* Value at ambient Temperature of 25°C with ΔT of 100°C Encoder feedback

Motor Type Reference	75DU					95DU					115DU					142DU					190DU									
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E					
Continuous Stall Torque* (Nm)	1.2	2.2	2.9	3.7	4.0	5.5	7.0	8.5	9.4	12.0	14.1	18.9	23.4	20.8	23.4	20.8	23.4	23.4	19.9	15.4	10.9	6.3	10.9	15.4	19.9	23.4	20.8	36.9	49.3	67.3
Peak Torque (Nm)	3.6	6.6	8.7	11.1	7.2	12.0	16.5	21.0	25.5	36.0	42.3	59.7	70.2	56.2	70.2	56.2	70.2	70.2	46.2	32.7	18.9	11.9	32.7	46.2	59.7	70.2	56.2	105.2	145.4	195.5
High Inertia (kgm ² x 10 ⁻³)	0.11	0.16	0.21	0.25	0.34	0.45	0.56	0.68	0.79	1.22	1.50	2.05	2.41	1.93	2.41	2.41	2.41	2.41	1.77	1.22	0.85	0.54	1.22	1.77	2.41	2.41	1.93	3.00	4.00	5.00
Standard Inertia (kgm ² x 10 ⁻³)	0.06	0.11	0.16	0.20	0.15	0.26	0.37	0.49	0.60	0.92	1.16	1.54	1.82	1.42	1.82	1.82	1.82	1.82	1.26	0.85	0.54	0.33	0.85	1.26	1.82	1.82	1.42	2.20	2.90	3.60
Weight (Kg)	3.0	2.7	4.4	5.1	5.0	6.1	7.2	8.3	9.5	11.6	13.2	18.9	23.4	19.9	23.4	23.4	23.4	23.4	15.4	10.9	6.3	4.0	10.9	15.4	19.9	23.4	19.9	33.0	40.0	48.0
Thermal Time Constant (sec)	1315	1431	1500	1587	1422	1618	1800	1997	2178	2792	3436	4792	5848	4792	5848	5848	5848	5848	4000	2858	1700	1000	2858	4000	5848	5848	4000	6445	8000	10000
Max. cogging (Nm)	0.02	0.03	0.04	0.05	0.03	0.06	0.08	0.10	0.12	0.18	0.21	0.29	0.34	0.29	0.34	0.34	0.34	0.34	0.22	0.16	0.09	0.06	0.16	0.22	0.29	0.34	0.29	0.46	0.54	0.67
Rated Speed: 2000 (rpm)	Ke (Vrms/krpm): 147.0																													
Rated Torque* (Nm)	1.1	1.9	2.7	3.4	2.2	3.7	5.1	6.5	7.9	11.3	14.1	19.9	23.4	19.9	23.4	23.4	23.4	23.4	15.4	10.9	6.3	4.0	10.9	15.4	19.9	23.4	19.9	34.8	40.8	50.8
Continuous Stall Current* (Arms)	0.51	0.90	1.19	1.54	0.98	1.66	2.30	2.90	3.54	5.31	6.71	9.49	11.3	9.49	11.3	11.3	11.3	11.3	7.49	5.31	3.17	2.00	5.31	7.49	9.49	11.3	9.49	15.36	18.52	23.03
Rated Power* (kW)	0.24	0.41	0.56	0.71	0.45	0.77	1.07	1.37	1.65	2.41	3.02	4.23	5.17	4.23	5.17	5.17	5.17	5.17	3.32	2.34	1.46	0.89	2.34	3.32	4.23	5.17	4.23	7.29	8.53	10.53
R (ph-ph) (Ohms)	172.55	56.14	28.80	19.88	52.00	16.50	3.79	5.81	4.25	27.80	8.55	4.55	2.96	2.17	13.40	4.00	2.10	1.35	0.98	1.90	0.67	0.39	1.90	2.10	2.96	3.32	2.10	3.60	4.10	5.10
L (ph-ph) (mH)	243.1	106.40	67.90	49.30	138.90	64.90	41.20	29.60	23.20	94.60	40.50	25.70	18.60	14.70	58.00	28.80	18.70	13.80	10.70	18.80	8.60	5.90	18.80	25.70	33.60	39.60	25.70	53.0	61.0	76.0
Rated Speed 3000 (rpm)	Ke (Vrms/krpm): 98.0																													
Rated Torque* (Nm)	1.1	1.9	2.6	3.3	2.2	3.6	5.0	6.3	7.7	11.3	14.1	19.9	23.4	19.9	23.4	23.4	23.4	23.4	15.4	10.9	6.3	4.0	10.9	15.4	19.9	23.4	19.9	34.8	40.8	50.8
Continuous Stall Current* (Arms)	0.77	1.34	1.79	2.30	1.47	2.50	3.46	4.35	5.31	7.49	9.49	11.3	11.3	11.3	11.3	11.3	11.3	7.49	5.31	3.17	2.00	5.31	7.49	9.49	11.3	9.49	15.36	18.52	23.03	
Rated Power* (kW)	0.35	0.61	0.80	1.03	0.68	1.13	1.58	1.99	2.41	3.32	4.23	5.17	6.11	5.17	6.11	6.11	6.11	6.11	4.00	2.85	1.70	1.00	2.85	4.00	5.17	6.11	5.17	8.53	9.80	12.00
R (ph-ph) (Ohms)	73.44	23.42	13.88	8.67	24.92	7.51	4.12	2.75	1.92	12.55	3.96	2.02	1.34	1.10	6.00	1.82	0.94	0.59	0.44	0.82	0.30	0.16	0.82	1.10	1.46	1.77	1.10	1.80	2.10	2.60
L (ph-ph) (mH)	109.20	47.70	31.50	22.80	63.50	28.50	18.30	13.20	10.30	43.10	18.60	11.40	8.60	7.40	31.00	13.30	8.30	6.10	4.80	8.60	4.00	2.80	8.60	11.40	14.60	17.70	11.40	23.0	27.0	34.0
Rated Speed 4000 (rpm)	Ke (Vrms/krpm): 73.5																													
Rated Torque* (Nm)	1.0	1.8	2.3	2.8	1.8	2.8	3.7	4.5	5.3	7.7	9.4	11.3	13.2	11.3	13.2	13.2	13.2	13.2	8.7	6.1	3.5	2.1	6.1	8.7	11.3	13.2	11.3	18.5	21.5	26.5
Continuous Stall Current* (Arms)	1.02	1.79	2.39	3.07	1.96	3.33	4.61	5.80	7.08	9.98	12.78	15.58	18.38	15.58	18.38	18.38	18.38	18.38	12.78	9.05	5.29	3.17	9.05	12.78	15.58	18.38	15.58	25.5	29.5	36.5
Rated Power* (kW)	0.43	0.77	0.94	1.16	0.77	1.16	1.54	1.89	2.23	3.02	3.73	4.53	5.33	4.53	5.33	5.33	5.33	5.33	3.65	2.58	1.46	0.89	2.58	3.65	4.53	5.33	4.53	7.29	8.53	10.53
R (ph-ph) (Ohms)	43.66	14.17	7.70	4.50	13.80	4.40	2.40	1.70	1.20	6.91	2.14	1.16	0.73	0.57	3.35	1.00	0.53	0.35	0.24	0.53	0.20	0.10	0.53	0.73	0.94	1.16	0.73	1.20	1.40	1.70
L (ph-ph) (mH)	61.70	27.20	18.10	12.70	35.90	16.10	10.10	7.60	5.80	23.50	10.20	6.60	4.70	3.90	17.60	7.50	4.70	3.60	2.70	4.70	2.10	1.40	4.70	6.60	8.70	10.80	7.50	15.0	17.0	21.0

The information contained in this specification is for guidance only and does not form part of any contract.
 CT Dynamics Limited have an ongoing process of development and reserve the right to change the specification without notice.
 Data is subject to a tolerance of ± 10%.

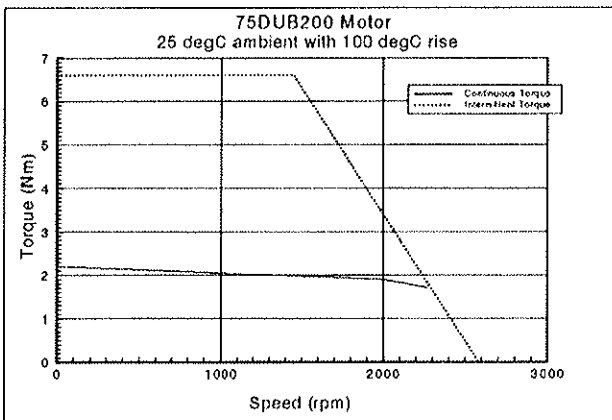
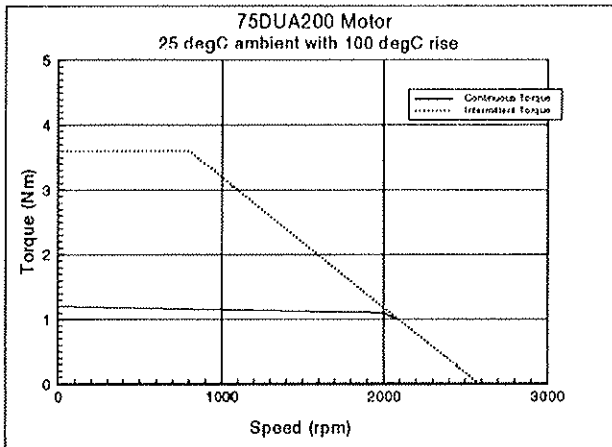
DUTYMAX DU BRUSHLESS SERVO MOTORS

Performance Data - 75 / 2000 RPM



Specified at 380 Volts - 3 phase with encoder feedback

The operating performance figures in this specification were derived by testing under the following conditions: The motor is mounted to an aluminum plate heatsink measuring 250 x 250 x 15mm. It is then operated at the rated winding temperature (ΔT of 100°C at 25°C ambient.)

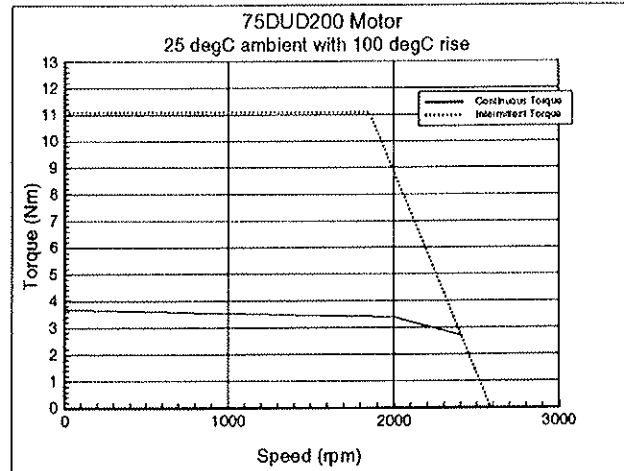
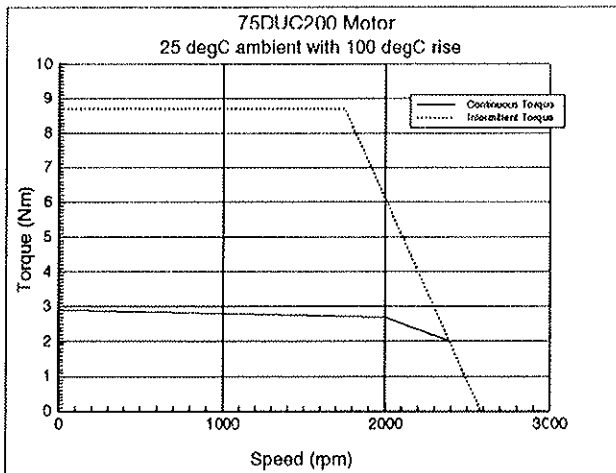


CONTINUOUS DUTY ZONE

The continuous duty zone is bordered by the maximum continuous torque and the system line voltage.

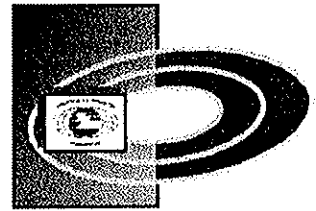
INTERMITTENT DUTY ZONE

The intermittent duty zone is bordered by the peak torque line and the system line voltage.



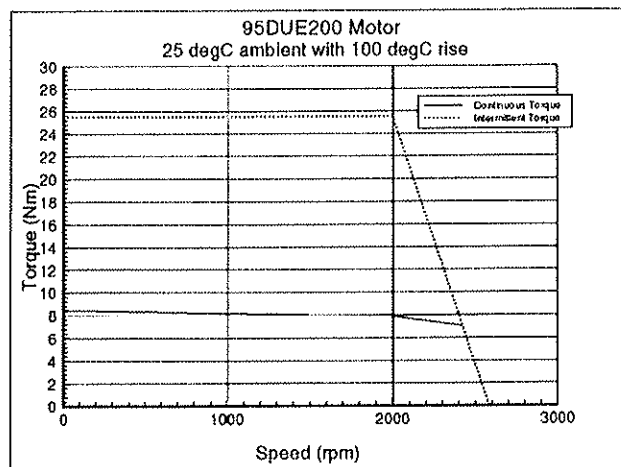
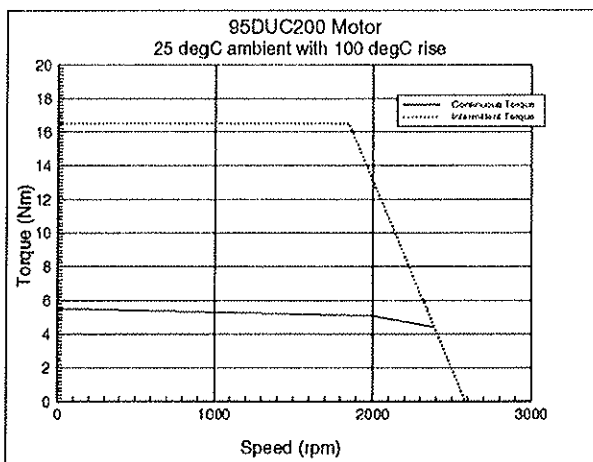
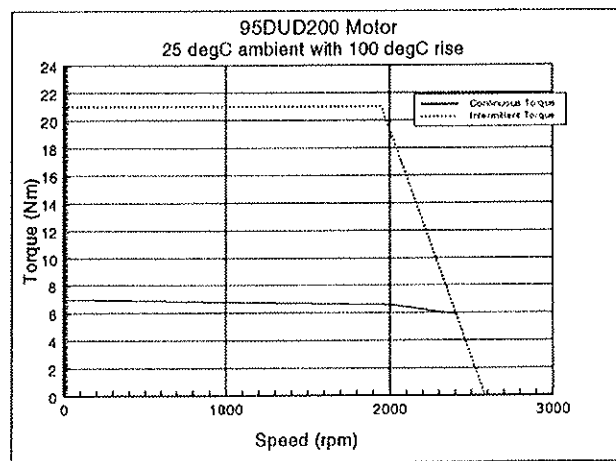
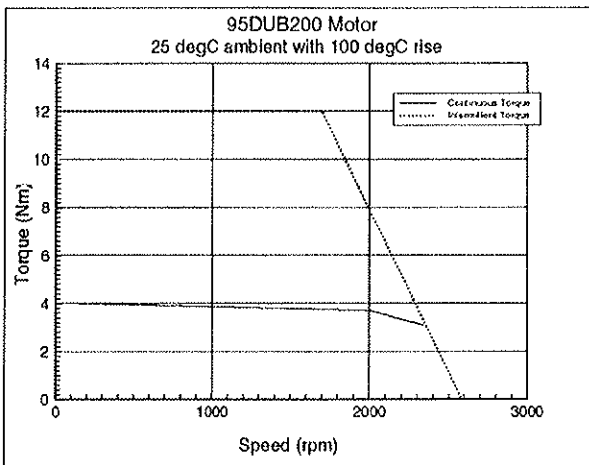
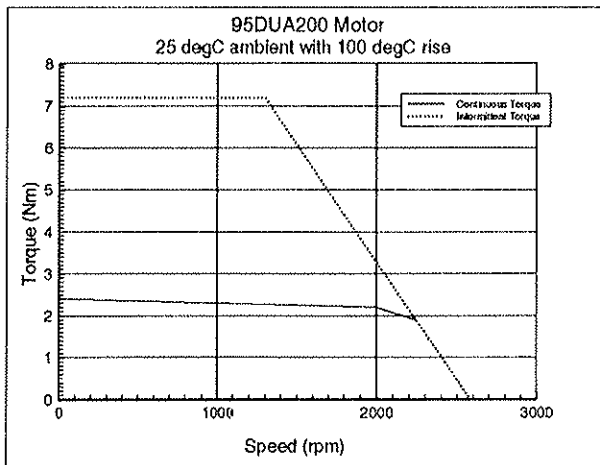
DUTYMAX DU BRUSHLESS SERVO MOTORS

Performance Data - 95 / 2000 RPM



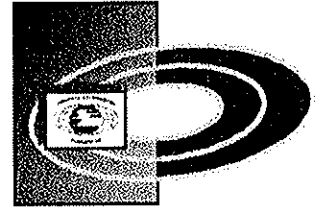
Specified at 380 Volts - 3 phase with encoder feedback

The operating performance figures in this specification were derived by testing under the following conditions: The motor is mounted to an aluminum plate heatsink measuring 250 x 250 x 15mm. It is then operated at the rated winding temperature (ΔT of 100°C at 25°C ambient.)



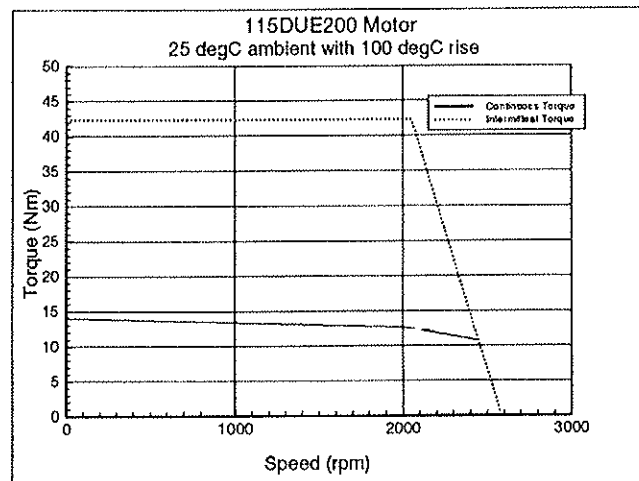
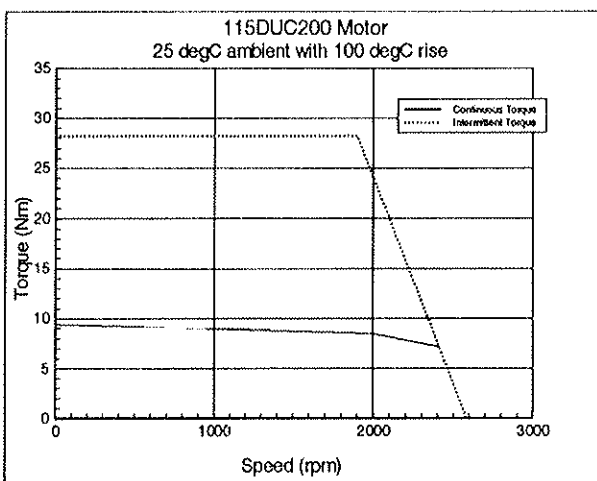
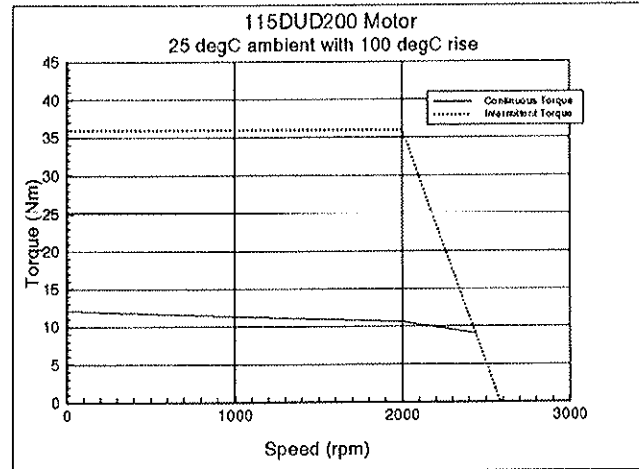
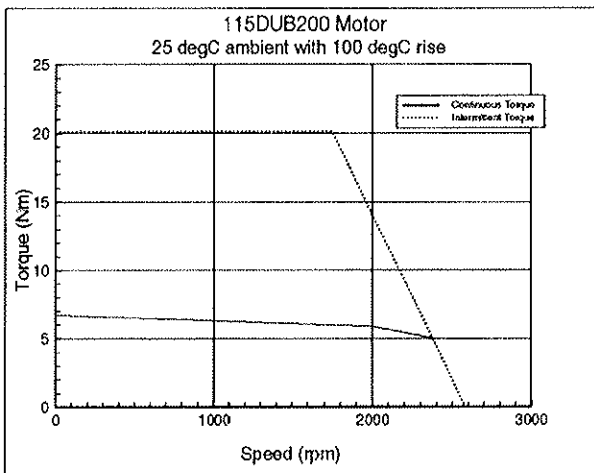
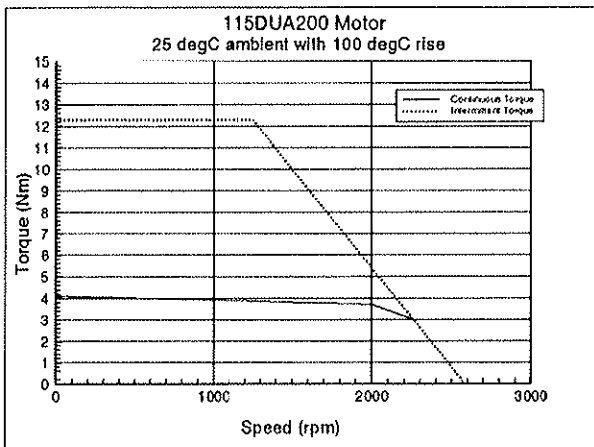
DUTYMAX DU BRUSHLESS SERVO MOTORS

Performance Data - 115 / 2000 RPM



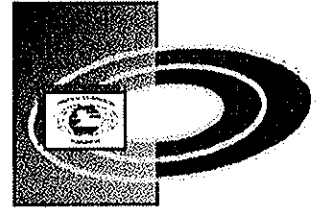
Specified at 380 Volts - 3 phase with encoder feedback

The operating performance figures in this specification were derived by testing under the following conditions: The motor is mounted to an aluminum plate heatsink measuring 350 x 350 x 20mm. It is then operated at the rated winding temperature (ΔT of 100°C at 25°C ambient.)



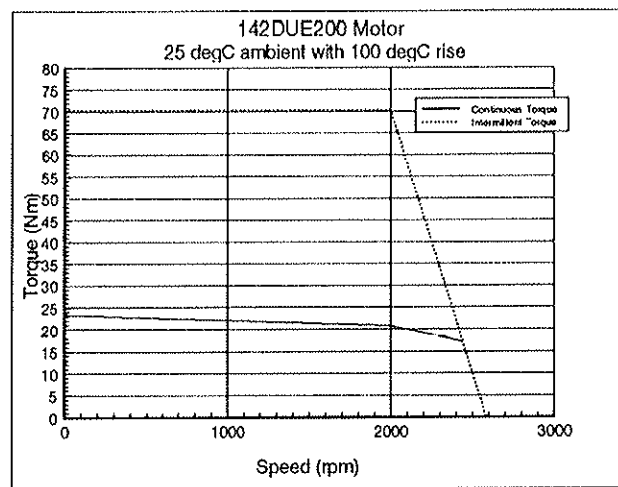
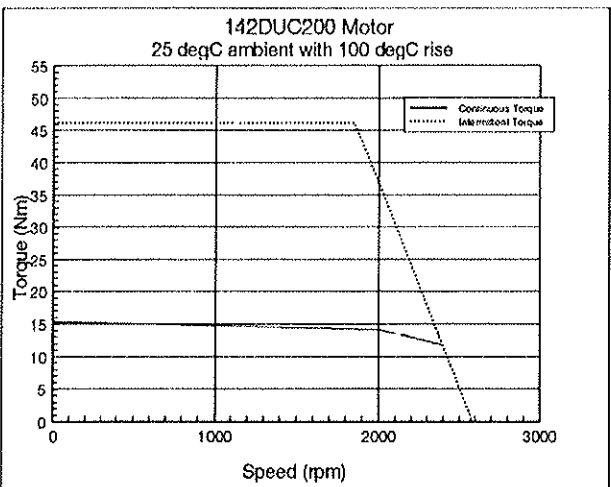
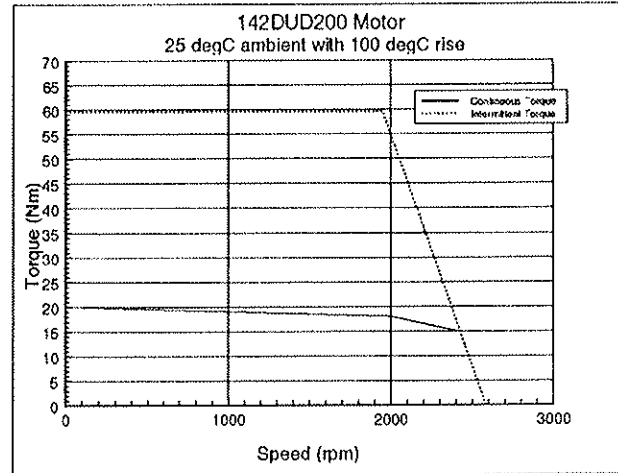
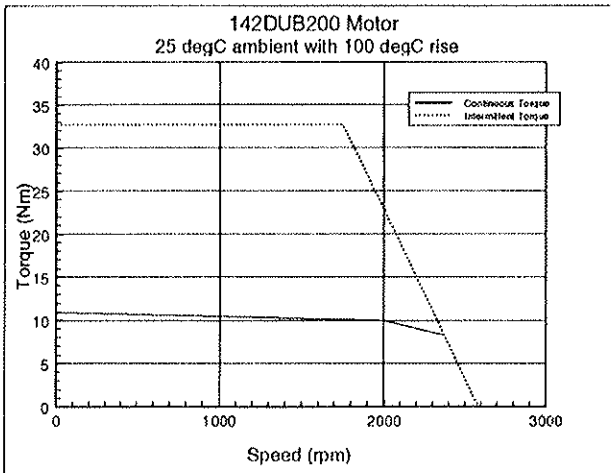
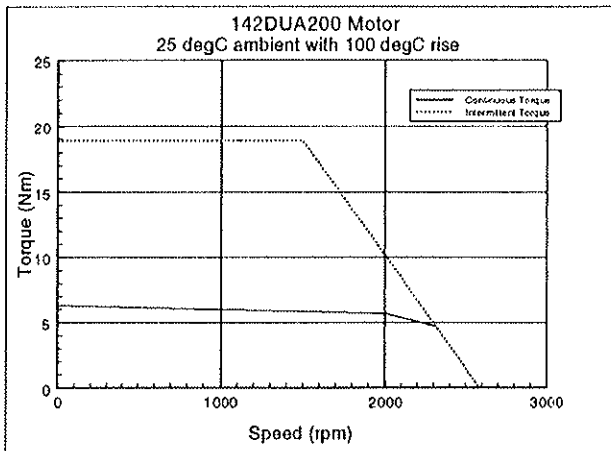
DUTYMAX DU BRUSHLESS SERVO MOTORS

Performance Data - 142 / 2000 RPM



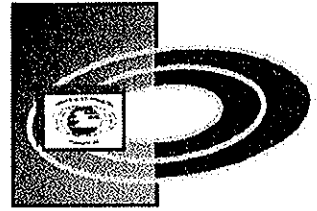
Specified at 380 Volts - 3 phase with encoder feedback

The operating performance figures in this specification were derived by testing under the following conditions: The motor is mounted to an aluminum plate heatsink measuring 350 x 350 x 20mm. It is then operated at the rated winding temperature (ΔT of 100°C at 25°C ambient.)



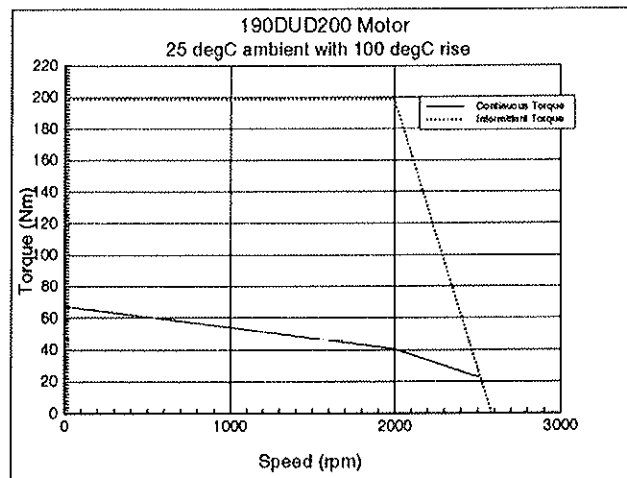
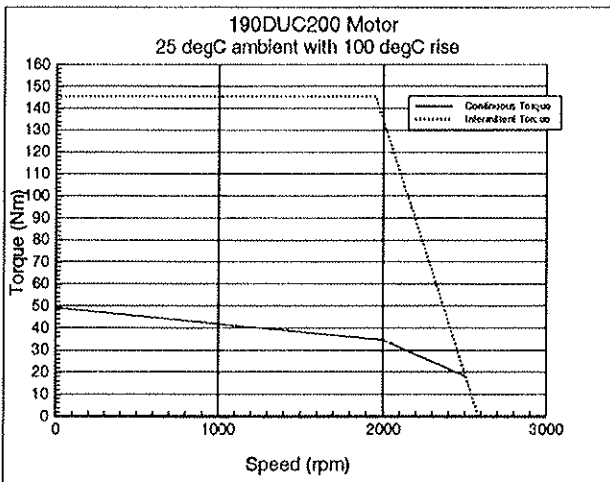
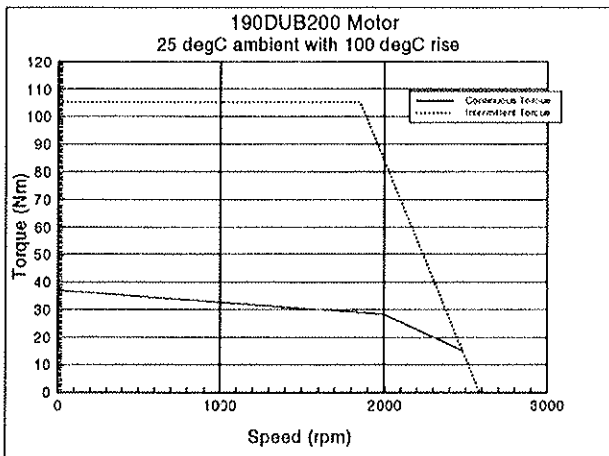
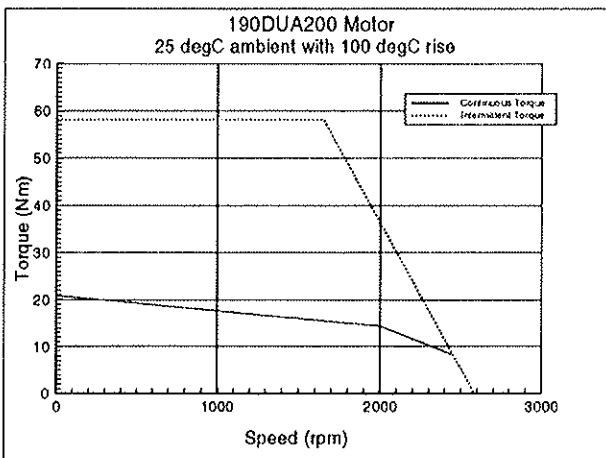
DUTYMAX DU BRUSHLESS SERVO MOTORS

Performance Data - 190 / 2000 RPM



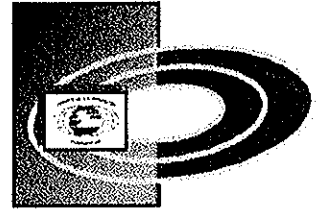
Specified at 380 Volts - 3 phase with encoder feedback

The operating performance figures in this specification were derived by testing under the following conditions: The motor is mounted to an aluminum plate heatsink measuring 500 x 500 x 20mm. It is then operated at the rated winding temperature (ΔT of 100°C at 25°C ambient.)



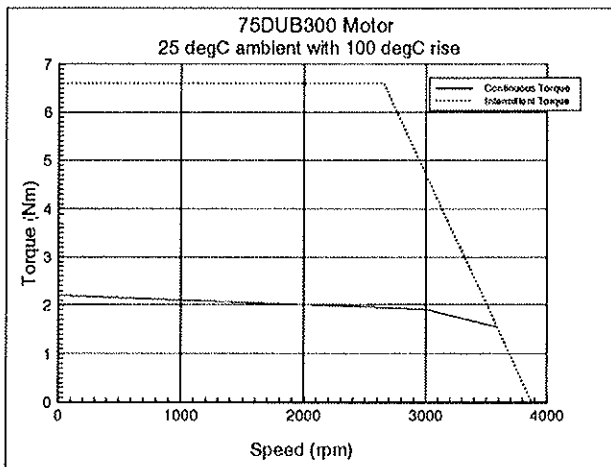
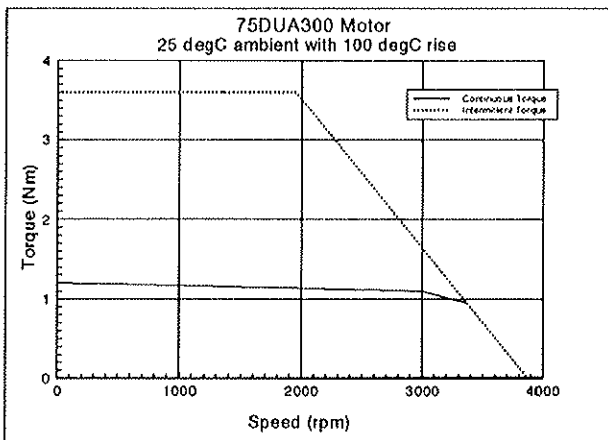
DUTYMAX DU BRUSHLESS SERVO MOTORS

Performance Data - 75 / 3000 RPM



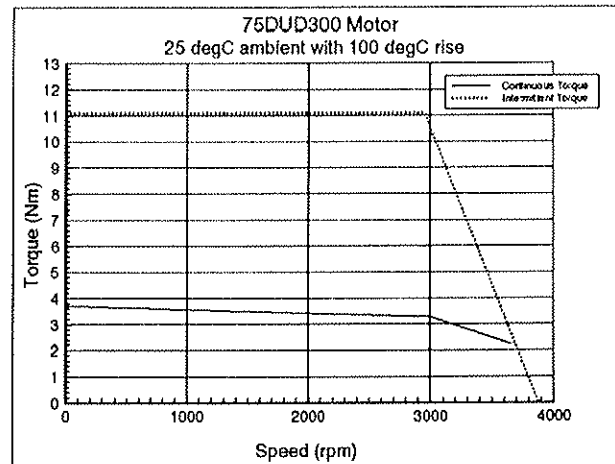
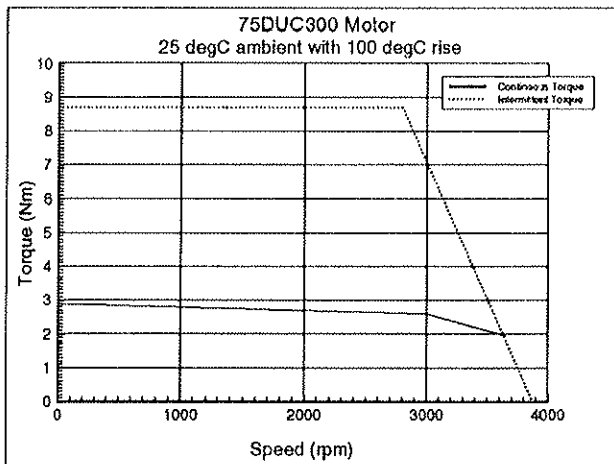
Specified at 380 Volts - 3 phase with encoder feedback

The operating performance figures in this specification were derived by testing under the following conditions: The motor is mounted to an aluminum plate heatsink measuring 250 x 250 x 15mm. It is then operated at the rated winding temperature (ΔT of 100°C at 25°C ambient.)



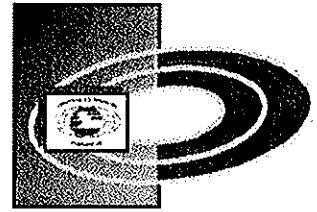
CONTINUOUS DUTY ZONE
The continuous duty zone is bordered by the maximum continuous torque and the system line voltage.

INTERMITTENT DUTY ZONE
The intermittent duty zone is bordered by the peak torque line and the system line voltage.



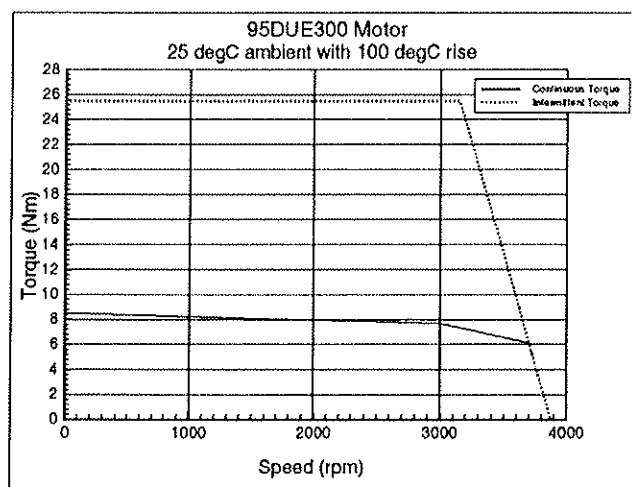
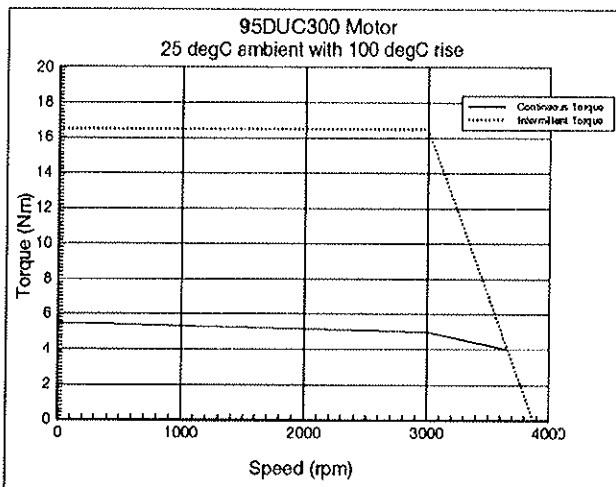
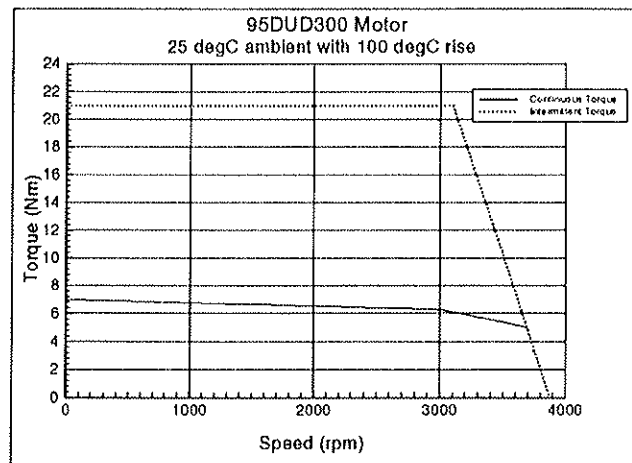
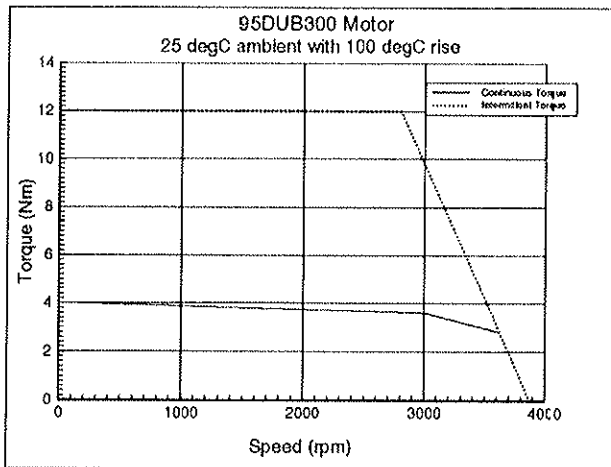
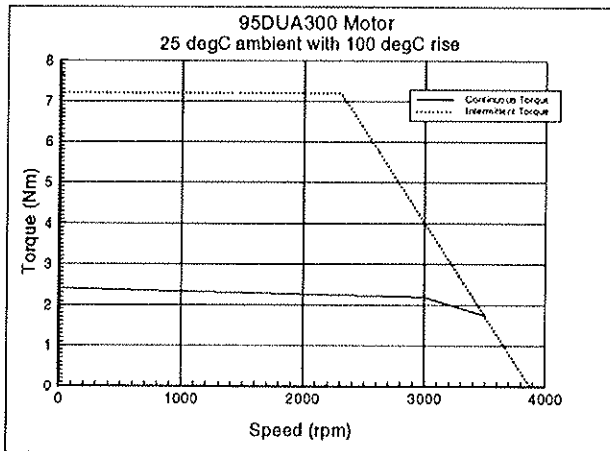
DUTYMAX DU BRUSHLESS SERVO MOTORS

Performance Data - 95 / 3000 RPM



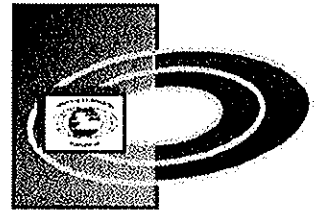
Specified at 380 Volts - 3 phase with encoder feedback

The operating performance figures in this specification were derived by testing under the following conditions: The motor is mounted to an aluminum plate heatsink measuring 250 x 250 x 15mm. It is then operated at the rated winding temperature (ΔT of 100°C at 25°C ambient.)



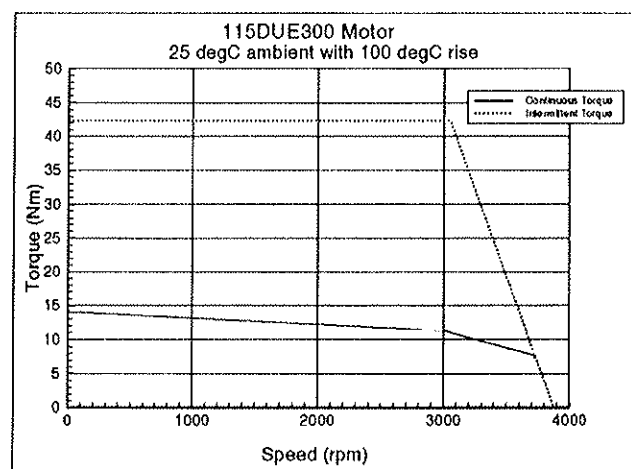
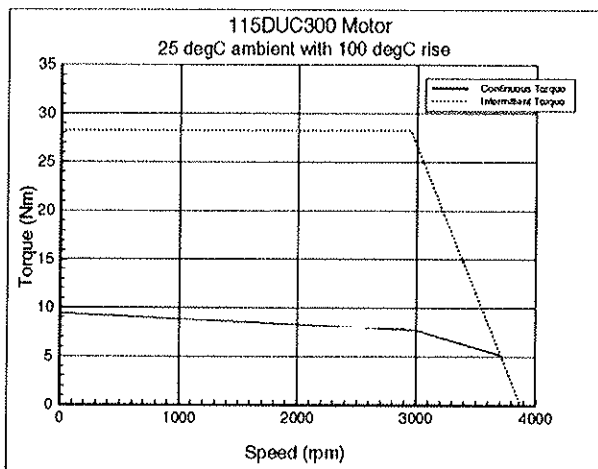
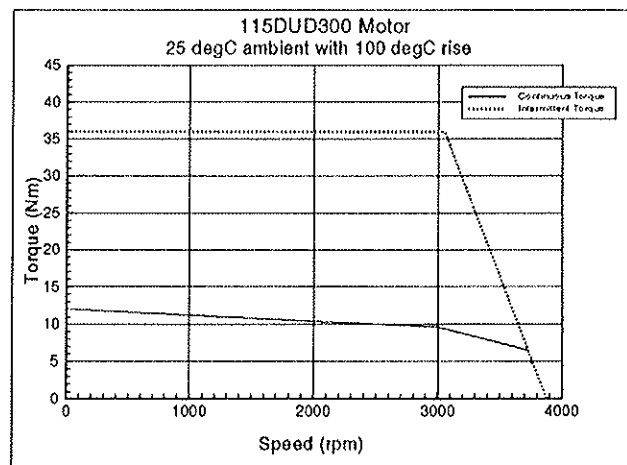
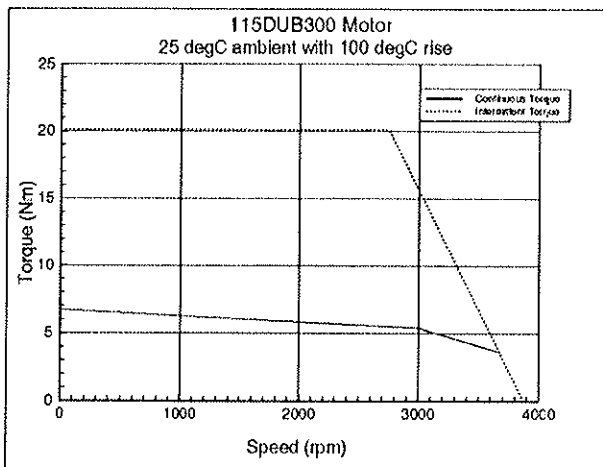
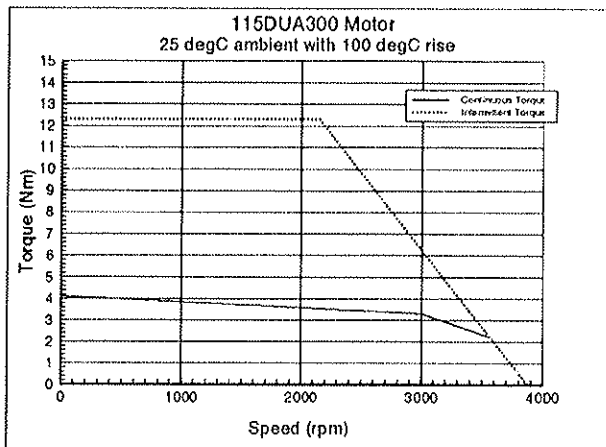
DUTYMAX DU BRUSHLESS SERVO MOTORS

Performance Data - 115 / 3000 RPM



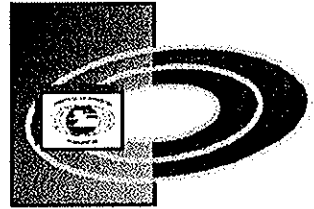
Specified at 380 Volts - 3 phase with encoder feedback

The operating performance figures in this specification were derived by testing under the following conditions: The motor is mounted to an aluminum plate heatsink measuring 350 x 350 x 20mm. It is then operated at the rated winding temperature (ΔT of 100°C at 25°C ambient.)



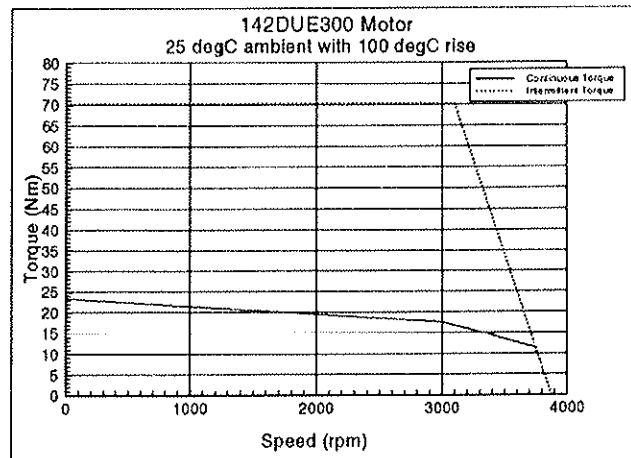
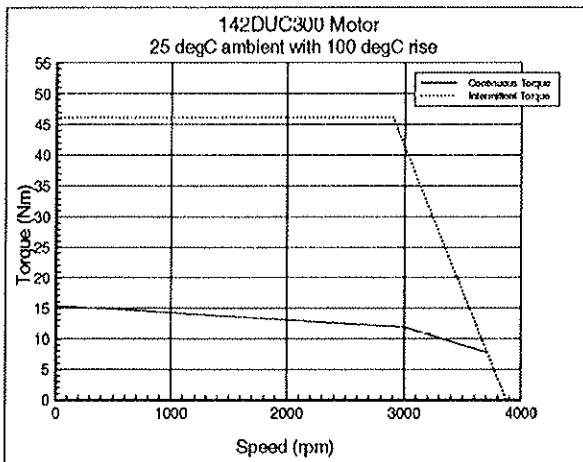
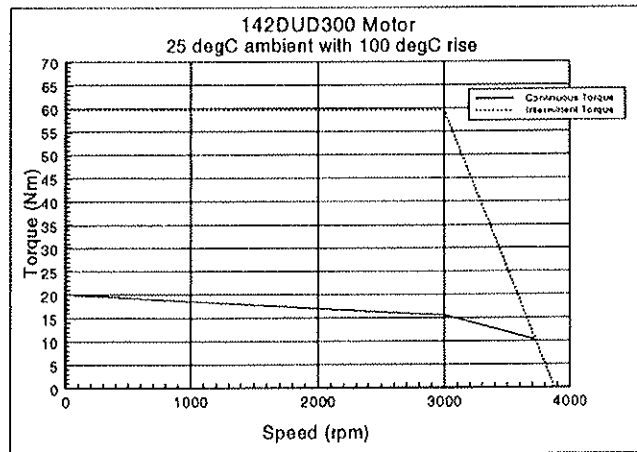
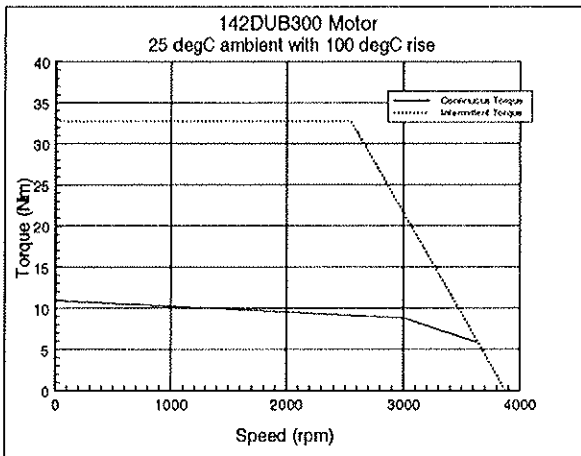
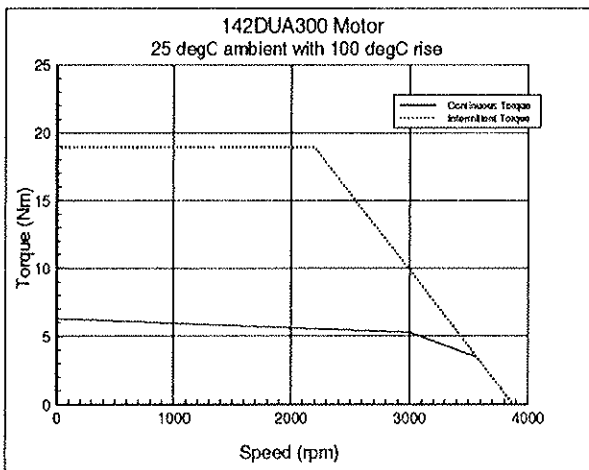
DUTYMAX DU BRUSHLESS SERVO MOTORS

Performance Data - 142 / 3000 RPM



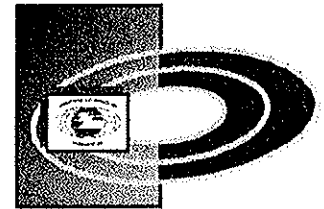
Specified at 380 Volts - 3 phase with encoder feedback

The operating performance figures in this specification were derived by testing under the following conditions: The motor is mounted to an aluminum plate heatsink measuring 350 x 350 x 20mm. It is then operated at the rated winding temperature (ΔT of 100°C at 25°C ambient.)



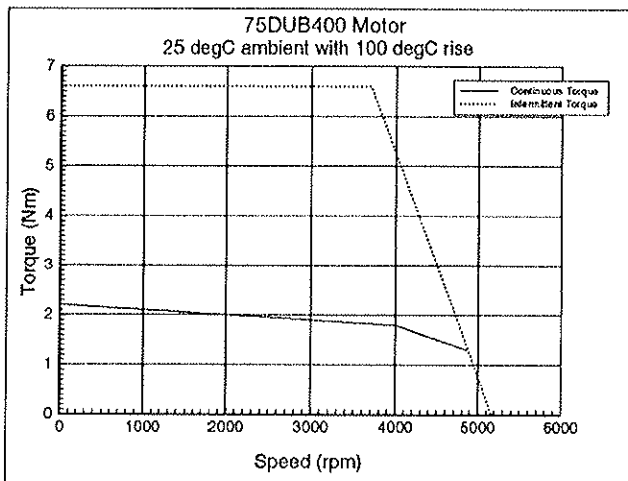
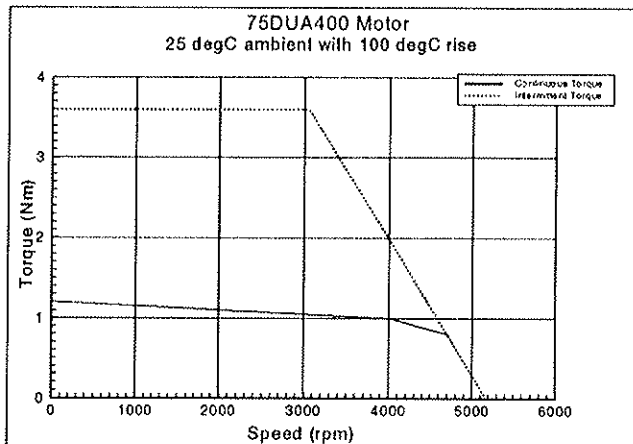
DUTYMAX DU BRUSHLESS SERVO MOTORS

Performance Data - 75 / 4000 RPM



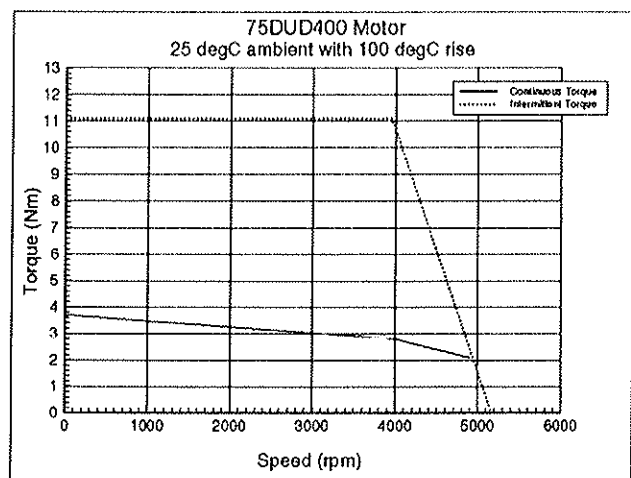
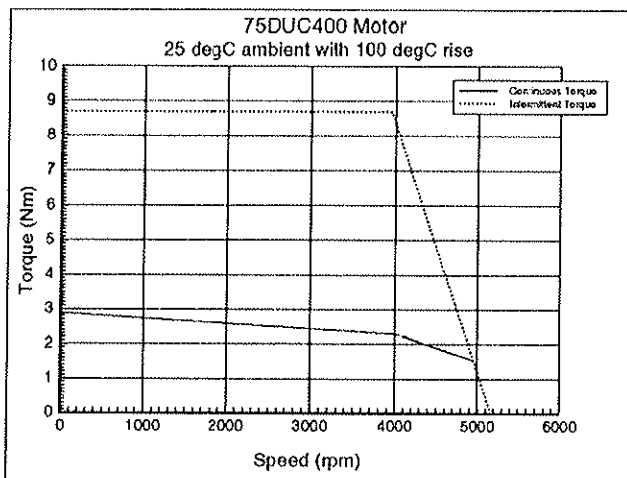
Specified at 380 Volts - 3 phase with encoder feedback

The operating performance figures in this specification were derived by testing under the following conditions: The motor is mounted to an aluminum plate heatsink measuring 250 x 250 x 15mm. It is then operated at the rated winding temperature (ΔT of 100°C at 25°C ambient.)



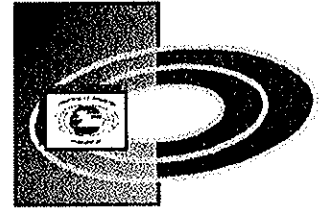
CONTINUOUS DUTY ZONE
The continuous duty zone is bordered by the maximum continuous torque and the system line voltage.

INTERMITTENT DUTY ZONE
The intermittent duty zone is bordered by the peak torque line and the system line voltage.



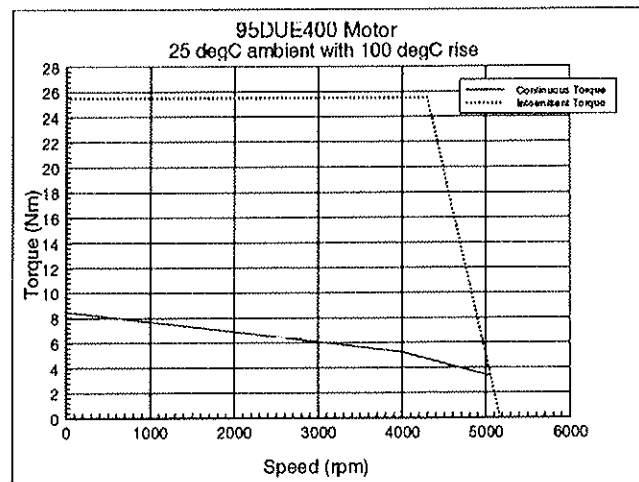
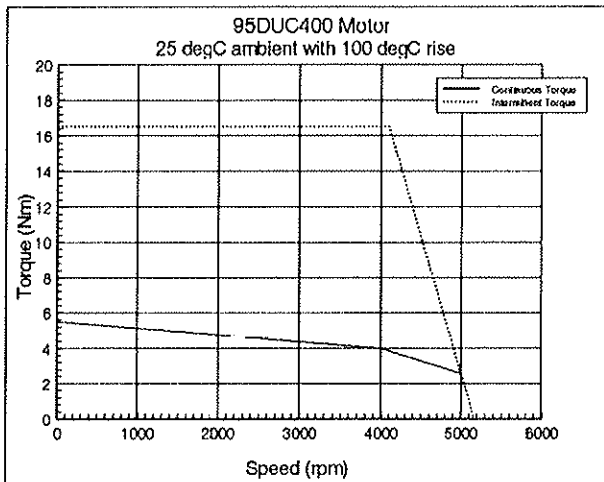
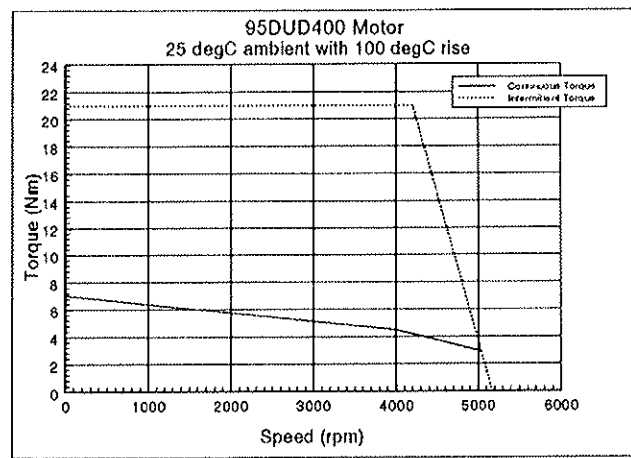
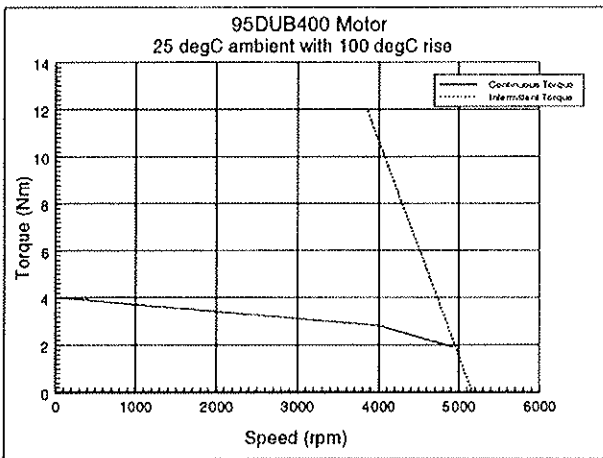
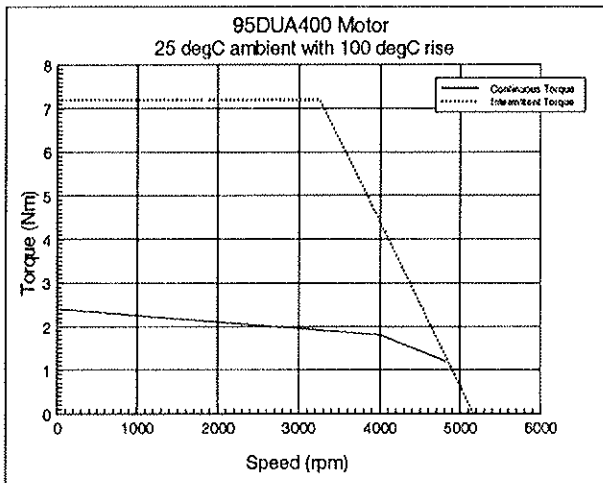
DUTYMAX DU BRUSHLESS SERVO MOTORS

Performance Data - 95 / 4000 RPM



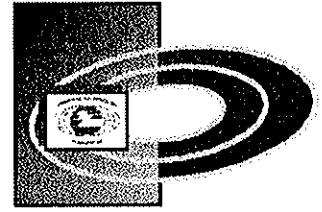
Specified at 380 Volts - 3 phase with encoder feedback

The operating performance figures in this specification were derived by testing under the following conditions: The motor is mounted to an aluminum plate heatsink measuring 250 x 250 x 15mm. It is then operated at the rated winding temperature (ΔT of 100°C at 25°C ambient.)



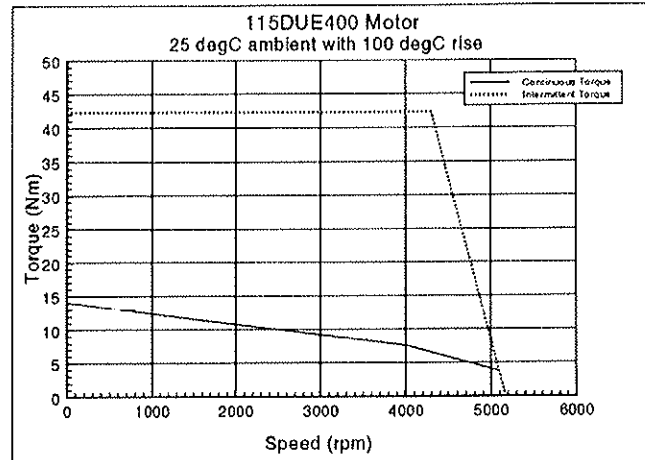
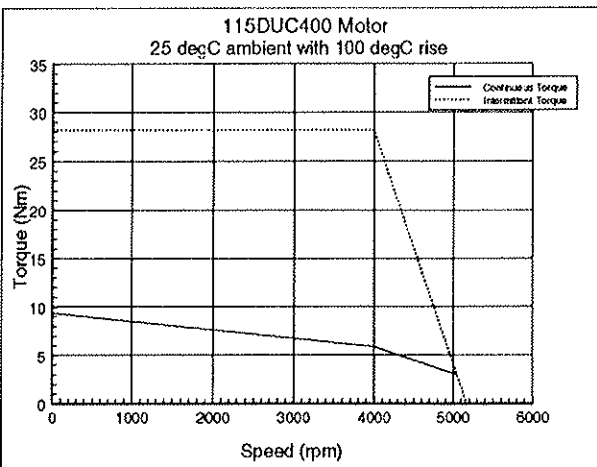
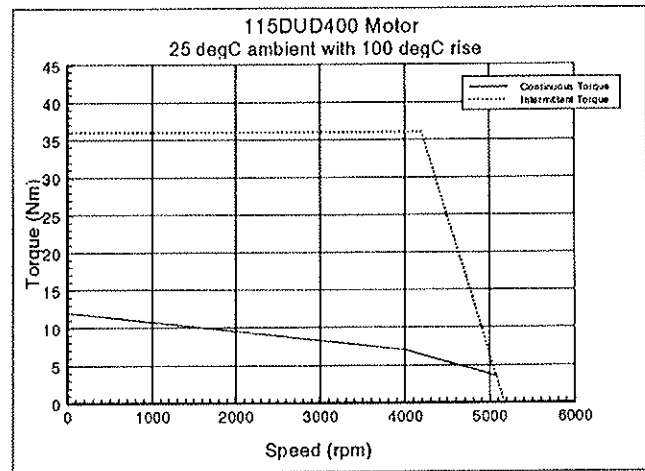
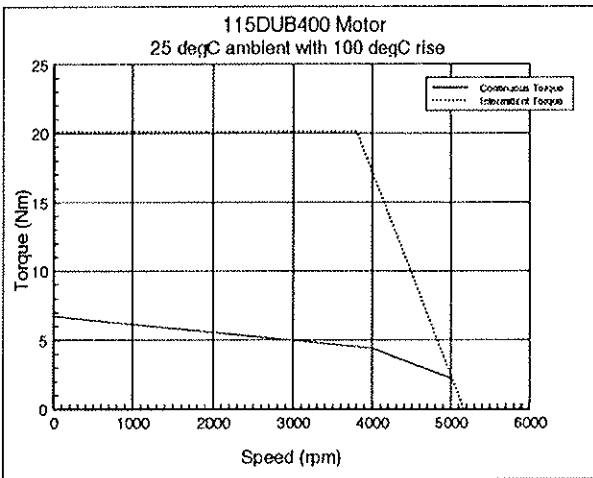
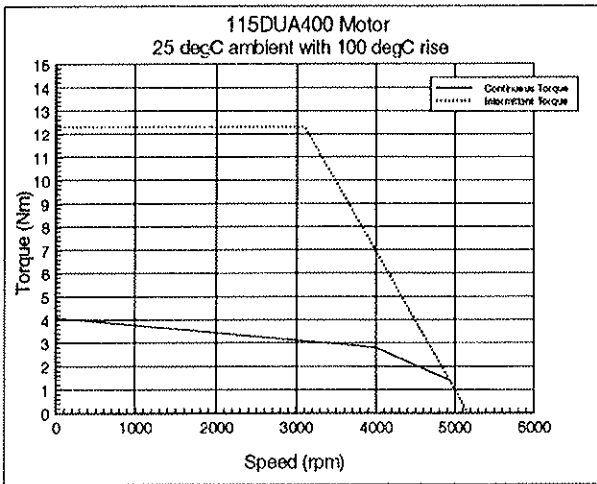
DUTYMAX DU BRUSHLESS SERVO MOTORS

Performance Data - 115 / 4000 RPM



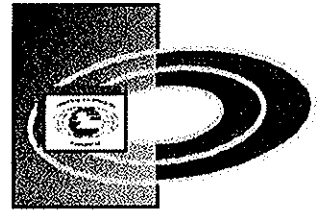
Specified at 380 Volts - 3 phase with encoder feedback

The operating performance figures in this specification were derived by testing under the following conditions: The motor is mounted to an aluminum plate heatsink measuring 350 x 350 x 20mm. It is then operated at the rated winding temperature (ΔT of 100°C at 25°C ambient.)



DUTYMAX DU BRUSHLESS SERVO MOTORS

Performance Data - 142 / 4000 RPM



Specified at 380 Volts - 3 phase with encoder feedback

The operating performance figures in this specification were derived by testing under the following conditions: The motor is mounted to an aluminum plate heatsink measuring 350 x 350 x 20mm. It is then operated at the rated winding temperature (ΔT of 100°C at 25°C ambient.)

