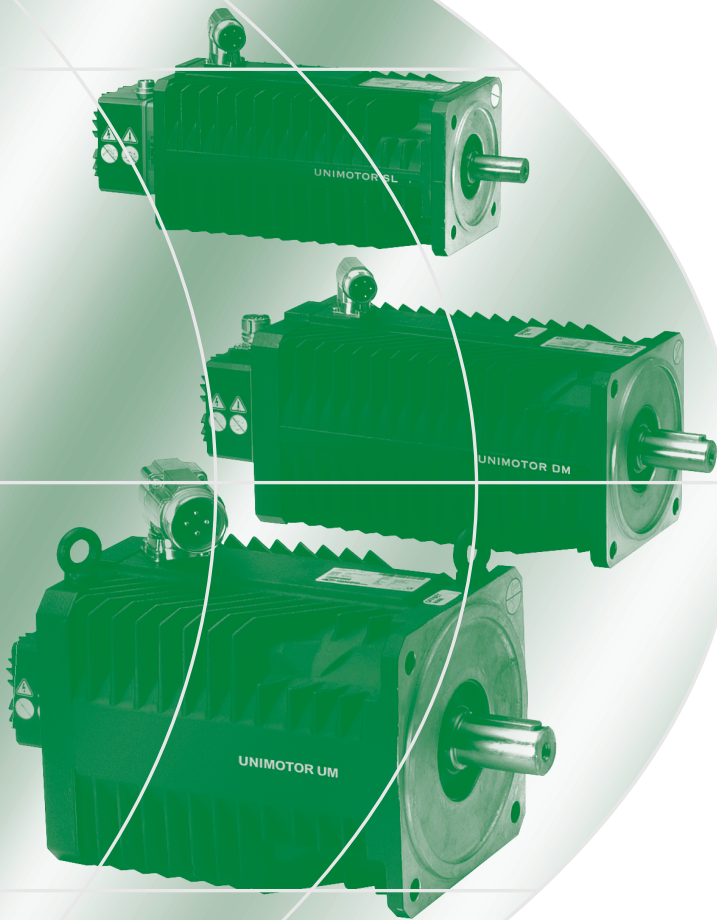




**CONTROL  
TECHNIQUES**

[www.ctdynamics.com](http://www.ctdynamics.com)



# Unimotor SL

## Brochure

Control Techniques Dynamics  
Brushless AC Servo Motors



## Introducing the 75-190SL motor

Unimotor is a range of brushless AC servo motors which support a winding to suit 400V nominal AC drives. The range is available in five frame sizes 75:95:115:142 and 190mm. The unique “finned” motor housing is a high-strength aluminium alloy casting that improves heat dissipation by conduction, radiation and convection. The single piece integral construction permits accurate bearing to housing alignment and maintains air gap concentricity. This arrangement optimises torque output and reduces cogging torque. The design also conforms to the sealing standard (IP65S) when mounted and connected.

## Standard Features

- \* Modular rotor design.
- \* Rotor assembly balanced to ISO1940 ( BS 6861 ) G 6.3.
- \* Class H winding insulation.
- \* High thermal dissipation due to “finned” design.
- \* Thermal overload protection.
- \* IEC mounting flange.
- \* Shaft key as standard.
- \* IP65S standard (with mating connector) sealed against water spray and dust.
- \* Connectors for Power and signal.
- \* Low inertia is standard for fast acceleration.
- \* UL and CSA recognised insulation system.

## Optional Features

- \* Hybrid box available.
- \* Parking brake.
- \* High inertia.
- \* Plain shaft (non keyed).
- \* UL recognised motors.

## Optional Products



- \* Cable assemblies for power and signal



- \* Gearbox options, high precision low backlash, general purpose and right angle gearboxes available in various ratios.

\* Where volumes have justified it, CTD have designed a number of custom specific motors, please contact CTD for details.

## Motor Specification

### Machinery Directive 89/392/EEC amended to 98/37/EC Low Voltage Directive 73/23/EEC

<b>EN 60034</b>	<b>General requirements for rotating electrical machinery</b>
EN 60034-1	Duty: S1 Continuous Storage: -15° to +40° Operating: Min ambient 0°C; max ambient 40°C Less than 1000M altitude Relative humidity: 90% Non condensing Thermal classification: H Delta 100/125°C
EN 60034-5	Degree of Ingress protection: IP65S (with mating connector & cable fitted)
EN 60034-6	Method of cooling: free circulation, free convection
EN 60034-7	Flange mounted: horizontally or vertically
EN 60034-8	Terminal markings: U V W,
EN 60034-11	Thermal protection: PTC thermistor, 165°C TP111 (Not SL variants)
EN 60038-18	Insulation system: Class H 600V, UL number E214439
<b>EN 60072</b>	<b>Dimensions and output for rotating electrical machines</b>
EN 60072-1	Type N (Customer variants)
<b>ISO1940-1</b>	<b>Balancing: to G6.3, (ISO8821 half key convention)</b>

Equipment is not deemed suitable for use in an explosive atmosphere.

This product has been designed to be operated with Control Techniques drives and must not be put into service unless the machinery into which it is to be incorporated has been declared in conformity with the provisions of the machinery directive.

## Brake Specification

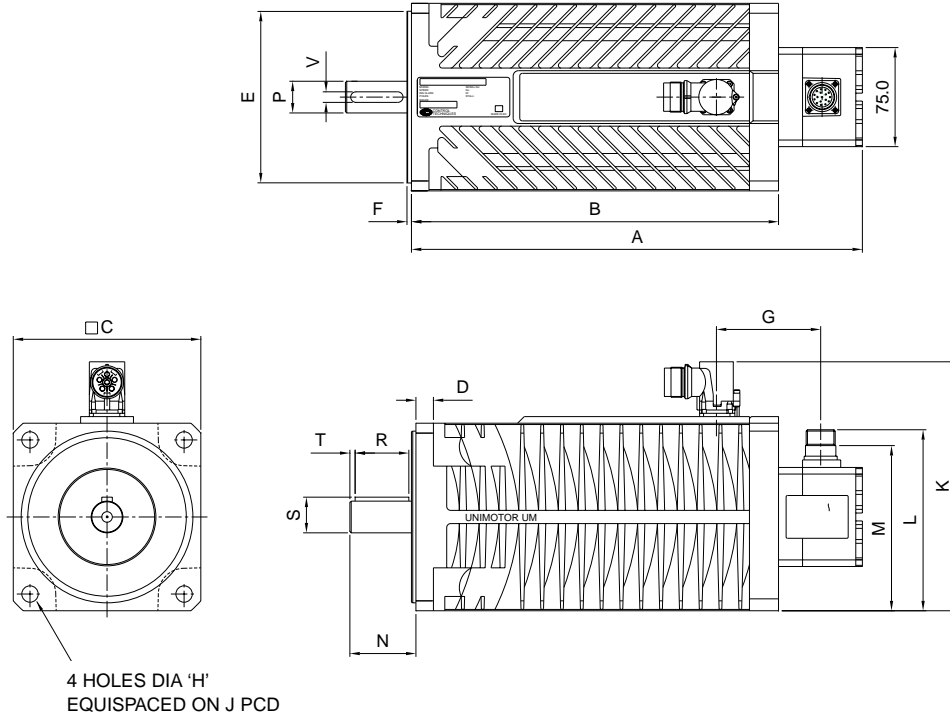
Motor Frame	Supply Volts	Input Power	Static Torque	Release Time	Moment of Inertia	Backlash
Size	V d.c.	Watts	Nm	ms nom	kgcm <sup>2</sup> *	Degrees
75	24	6.3	2	22	0.03	0.75
95	24	16	6	30	0.29	0.75
115	24	16	12	40	0.49	0.75
142	24	23	20	85	1.28	0.6
190(A/B)	24	25	40	95	1.28	0.6
190(C/D)	24	25	60	120	2.50	0.6

\*Note 1 kgcm<sup>2</sup> = 1x10<sup>-4</sup>kgm<sup>2</sup>

- The brakes are intended for parking duty and engage on power de-energisation.
- Refer to drive centre if your application requires dynamic braking in emergency conditions.
- To provide protection to the brake control circuit it is recommended that a diode is connected across the output terminals of the solid state or relay contacts devices.

## Dimensions (mm) Frame size 75-142

Note: Dimension A,B,M,L and K are shown at the maximum.



## Dimensions – Frame Sizes 75-142

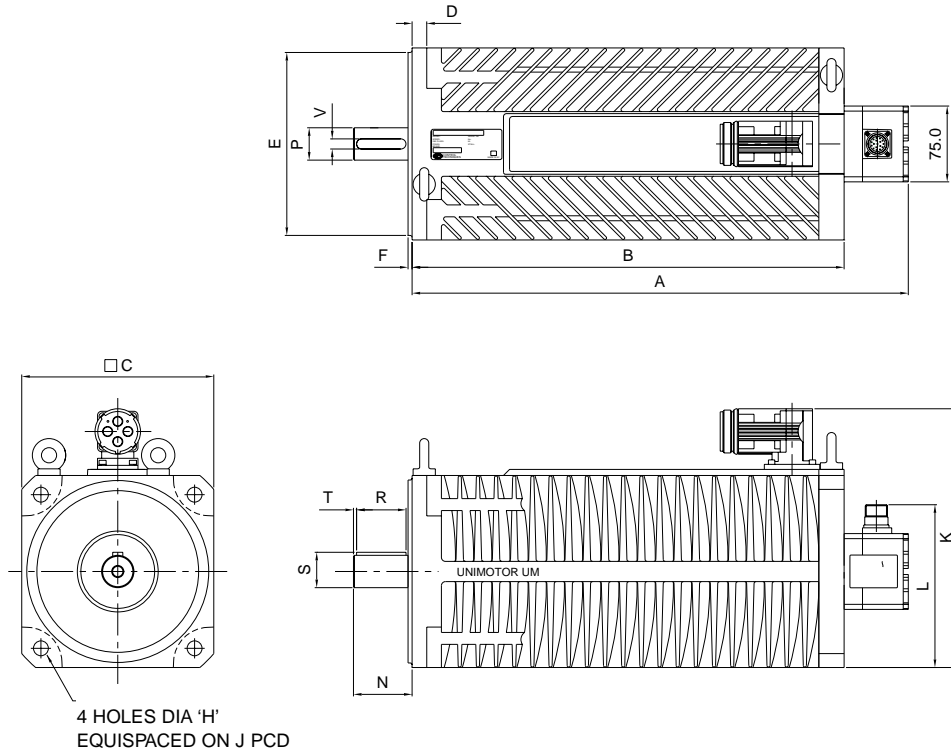
FRAME SIZE	75				95					115					142				
	A	B	C	D	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
A Length Overall (Unbraked)	211	241	271	301	222	252	282	312	342	242	272	302	332	362	225	255	285	315	345
A Length Overall (Braked)	241	271	301	331	252	282	312	342	372	272	302	332	362	392	285	315	345	375	405
B Body Length (Unbraked)	146	176	206	236	157	187	217	247	277	177	207	237	267	297	190	190	220	250	280
B Body Length (Braked)	176	206	236	266	187	217	247	277	307	207	237	267	297	327	220	250	280	310	340
C Flange Square	75.0				95.0					115.0					142.0				
D Flange Thickness	7.0				9.0					11.0					12.3				
E Register Diameter	60.0 (J6)				80.0 (J6)					95.0 (J6)					130.0 (J6)				
F Register Length	2.4				2.9					2.9					3.4				
G Power to Connect C/L	61.0				62.5					66.0					80.0				
H Fixing Holes Diameter	5.8 (H14)				7.0 (H14)					10.0 (H14)					12.0 (H14)				
J Fixing Hole p.c.d.	75.0				100.0					115.0					165.0				
K Overall Height	126.0				146.0					166.0					193.0				
L Signal Connector Height (UM)	107.0				117.0					127.0					140.0				
M Signal Connector Height (SL)	88.0				98.0					108.0					121.0				
N Shaft Length (front)	23.0	30.0	30.0	30.0	30.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
P Shaft Diameter (front)	11.0	14.0	14.0	14.0	14.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0

### Shaft Key Dimensions (option A)

R Key Length	14.0	22.0	22.0	22.0	22.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
S Key Height	12.4	15.9	15.9	15.9	15.9	21.4	21.4	21.4	21.4	21.4	21.4	21.4	26.9	26.9	26.9	26.9	26.9	26.9	26.9
T Key to Shaft End	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
V Key Width	4.0	5.0	5.0	5.0	5.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0

## Dimensions (mm) Frame size 190

Note: Dimension A,B,M,L and K are shown at the maximum.



## Dimensions (mm) Frame size 190

### FRAME SIZE

190

Dimension / Length suffix	A	B	C	D
A Length Overall (Unbraked)	273	327	381	435
A Length Overall (Braked)	327	381	435	489
B Body Length (Unbraked)	210	264	318	372
B Body Length (Braked)	264	318	372	425
C Flange Square		190.0		
D Flange Thickness		14.5		
E Register Diameter		180.0 (J6)		
F Register Length		4.0		
G Power to Connect C/L		0		
H Fixing Holes Diameter		14.5 (H14)		
J Fixing Hole p.c.d.		215.0		
K Overall Height		260.0		
L Signal Connector Height (UM)		161.1		
N Shaft Length (front)	58.0	58.0	58.0	58.0
P Shaft Diameter (front)	32.0(K6)	32.0(K6)	32.0(K6)	32.0(K6)

### Shaft Output Key Dimensions (option A)

R Key Length	49.0
S Key Height	35.0
T Key to Shaft End	3.1
V Key Width	10.0



## SL servo motor technical specifications

## For 3 Phase VPWM Drives 380 - 480Vrms

v.21M, last updated: 7/1/04

Unimotors with Encoder Feedback  
 $\Delta t = 100^\circ\text{C}$

Stall torque; rated torque and power relate to maximum continuous operation in a 40°C ambient

All data subject to  $\pm 10\%$  tolerance

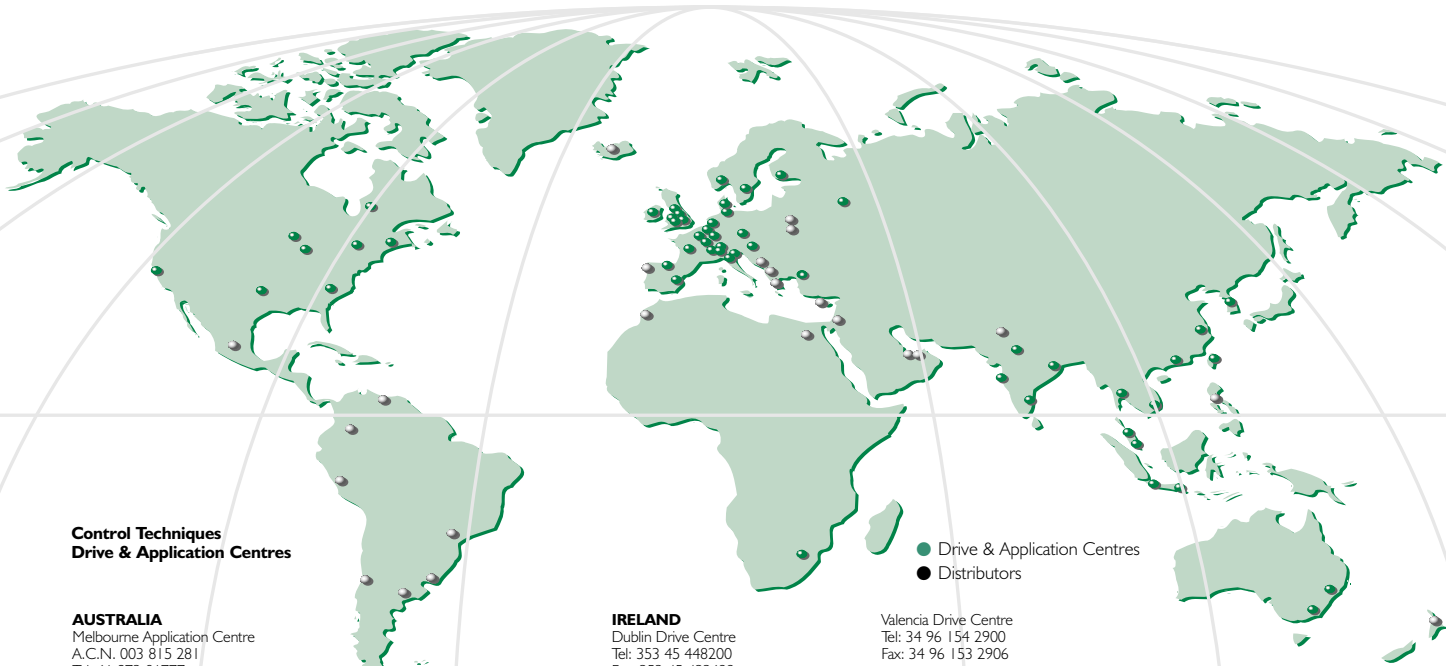
All Speeds	75					95					115					142					190				
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
Continuous Stall Torque (Nm)	1.2	2.2	3.1	3.9	4.3	2.3	4.3	5.9	7.5	9.0	3.5	6.6	9.4	12.4	15.3	6.3	10.8	15.3	19.8	23.4	21.8	41.1	58.7	73.2	
Peak Torque nominal (Nm)	3.6	6.6	9.3	11.7	6.9	12.9	17.7	22.5	27.0		10.5	19.8	28.2	37.2	45.9	18.9	32.4	45.9	59.4	70.2	65.4	123	176	219	
High Inertia (kgcm <sup>2</sup> )	1.2	1.6	2.1	2.5	3.5	4.5	5.6	6.7	7.8		9.7	12.0	14.3	16.6	18.8	21.6	28.0	34.3	40.7	47.0	93.5	141	188	235	
Standard Inertia (kgcm <sup>2</sup> )	0.6	1.0	1.5	1.9	1.4	2.5	3.6	4.7	5.8		3.2	5.5	7.8	10.0	12.3	7.8	14.1	20.5	26.8	33.1	50.0	97.0	144	191	
Winding Thermal Time Const. (sec)	81	74	94	100	172	168	183	221	228		175	185	198	217	241	213	217	275	301	365	240	242	319	632	
Maximum Cogging (Nm)	0.02	0.03	0.04	0.05	0.03	0.06	0.08	0.10	0.13		0.06	0.10	0.14	0.18	0.21	0.09	0.16	0.23	0.30	0.35	0.30	0.54	0.72	0.99	
<b>Rated Speed 2000 (rpm)</b>																									
Kt (Nm/A) 2.40 Ke (V/krpm) 147																									
Rated Torque (Nm)	1.1	2.1	3.0	3.8	2.2	4.0	5.5	6.9	8.2		3.2	6.1	8.7	10.8	14.0	5.9	10.3	14.6	18.4	21.3	20.0	36.9	50.4	54.7	
Stall Current (A)	0.5	1.0	1.3	1.7	1.0	1.8	2.5	3.2	3.8		1.5	2.8	4.0	5.2	6.4	2.7	4.5	6.4	8.3	9.8	9.1	17.2	24.5	30.5	
Rated Power (kW)	0.23	0.44	0.63	0.80	0.46	0.84	1.15	1.45	1.72		0.67	1.28	1.82	2.26	2.93	1.24	2.16	3.06	3.85	4.46	4.19	7.73	10.6	11.5	
R (ph-ph) (Ohms)	144	48.2	25.0	15.7	59.0	17.0	9.90	6.00	4.30		27.8	8.55	4.55	2.96	2.17	12.5	3.60	2.10	1.35	0.98	1.80	0.56	0.33	0.23	
L (ph-ph) (mH)	214	99.2	59.2	44.7	131	54.5	36.5	25.6	18.9		94.6	40.5	25.7	18.6	14.7	58.0	29.8	18.7	13.6	10.7	28.1	13.0	8.90	6.30	
<b>Rated Speed 3000 (rpm)</b>																									
Kt (Nm/A) 1.60 Ke (V/krpm) 98.0																									
Rated Torque (Nm)	1.1	2.0	2.8	3.5	2.0	3.9	5.4	6.8	8.1		3.0	5.5	8.1	10.4	12.6	5.4	9.0	12.2	15.8	18.0	19.2	33.0	35.0	36.8	
Stall Current (A)	0.8	1.4	2.0	2.5	1.5	2.7	3.7	4.7	5.7		2.2	4.2	5.9	7.8	9.6	4.0	6.8	9.6	12.4	14.7	13.7	25.7	36.7	45.8	
Rated Power (kW)	0.35	0.63	0.88	1.10	0.63	1.23	1.70	2.14	2.54		0.94	1.73	2.54	3.27	3.96	1.70	2.83	3.83	4.96	5.65	6.03	10.4	11.0	11.6	
R (ph-ph) (Ohms)	80.8	20.1	10.5	7.5	24.5	6.80	4.00	2.50	2.00		12.6	3.86	2.02	1.40	1.10	5.63	1.72	0.94	0.61	0.44	0.79	0.30	0.14	0.09	
L (ph-ph) (mH)	98.4	41.8	27.6	19.7	57.9	24.3	15.5	10.9	8.50		43.1	18.6	11.4	8.60	7.40	31.0	13.3	8.30	6.10	4.80	13.2	6.11	3.60	2.46	
<b>Rated Speed 4000 (rpm)</b>																									
Kt (Nm/A) 1.20 Ke (V/krpm) 73.5																									
Rated Torque (Nm)	1.0	1.7	2.3	2.9	1.8	3.0	4.0	4.9	5.7		2.5	4.7	6.3	7.5	8.7	3.6	7.0	8.9	10.7	12.2	▲	▲	▲	N/A	
Stall Current (A)	1.0	1.9	2.6	3.3	2.0	3.6	5.0	6.3	7.5		3.0	5.5	7.9	10.4	12.8	5.3	9.0	12.8	16.5	19.5					
Rated Power (kW)	0.42	0.71	0.96	1.21	0.75	1.26	1.68	2.05	2.39		1.05	1.97	2.64	3.14	3.64	1.51	2.93	3.73	4.48	5.11					
R (ph-ph) (Ohms)	36.8	10.5	6.30	4.20	12.7	4.08	2.10	1.50	1.03		6.91	2.14	1.16	0.73	0.57	3.12	1.00	0.53	0.35	0.24					
L (ph-ph) (mH)	54.9	24.8	14.9	10.8	31.5	13.6	8.50	6.30	4.80		23.5	10.2	6.60	4.70	3.90	17.6	7.50	4.70	3.60	2.70					
<b>Rated Speed 6000 (rpm)</b>																									
Kt (Nm/A) 1.80 Ke (V/krpm) 49.0																									
Rated Torque (Nm)	0.9	1.6	2.1	2.6	1.3	2.1	2.8	3.3	3.7		2.2	4.0	5.1	▲	N/A		2.9	4.5	▲	▲	N/A				
Stall Current (A)	1.5	2.8	3.9	4.9	2.9	5.4	7.4	9.4	11.3		4.4	8.3	11.8			7.9	13.5								
Rated Power (kW)	0.57	1.01	1.32	1.63	0.82	1.32	1.76	2.07	2.32		1.38	2.51	3.20			1.82	2.83								
R (ph-ph) (Ohms)	15.0	5.00	2.66	1.90	5.45	1.82	1.05	0.62	0.48		3.10	0.97	0.50			1.42	0.46								
L (ph-ph) (mH)	24.0	10.6	6.80	4.80	14.1	6.00	3.80	2.70	2.10		15.5	4.81	2.94			7.72	3.44								

N/A Not available

▲ Consult factory

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