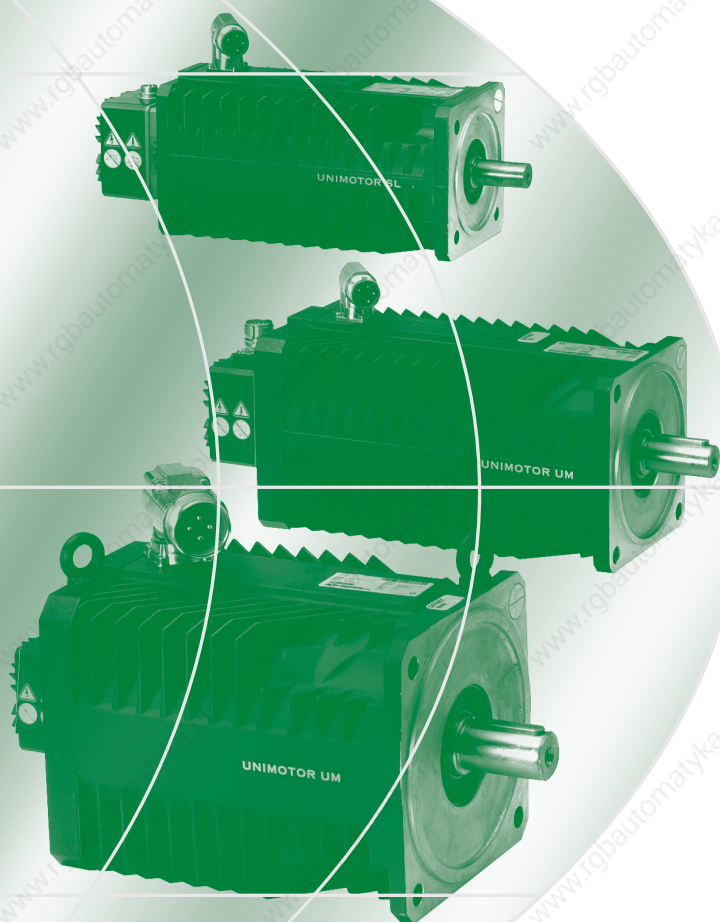




**CONTROL
TECHNIQUES**

www.ctdynamics.com



Unimotor Brochure

Control Techniques Dynamics
Brushless AC Servo Motors



Introducing Unimotor

Unimotor is a range of brushless AC servo motors from CT Dynamics. They are three phase, 6 or 8 pole, permanent magnet motors exhibiting a sinusoidal back EMF characteristic. The motors supply high torque with either low or high rotor inertia and minimal cogging torque.

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 compact design gives increased torsional stiffness. Laminations and coils are optimised both for high efficiency and to provide low harmonic distortion in the airgap flux. Combined with the high energy magnets, and a choice of rotor inertia, these features provide superb dynamic performance to suit all requirements.

The integral housing and front flange design increases thermal dissipation and improves sealing (IP65 standard, when mounted and connected).

Standard Features

- Unique 'finned' design - high thermal dissipation
- Encoder for high precision feedback integral commutation
- PTC thermistors for thermal monitoring and overload protection
- Low inertia is standard for fast acceleration
- IEC mounting flange
- Key shaft is standard
- IP65 standard (when connected) - sealed against water spray and dust
- Low cogging torque & THD (Total Harmonic Distortion)
- Rotor assembly balanced to ISO 1940 grade 6
- High standard of mechanical design and precision manufacture - for improved performance and quality
- Winding insulation is to Class H
- Bearing system designed for prolonged motor life
- Modular construction
- CE marked
- UL and CSA recognised insulation system
- Incremental optical encoder 4096 ppr up to 3000 rpm
- Incremental optical encoder 2048 ppr above 3000 rpm

Optional Features

- Absolute encoder - 4096 multi-turns
- Resolver feedback for high temperature applications
- Sine/Cosine encoder for high resolution (single and multi-turn)
- High inertia option
- Plain shaft (non keyed)
- Gearbox options
- Brake
- SLM technology
- UL recognised motor

Specification

Physical

Insulation Class	Class H, BS EN 60034-1.
Dimensional Accuracy	IEC 60072-1, Class N (normal class).
Degree of Balance	Rotor balanced to ISO 1940 (BS 6861) G 6.3 (half key convention to ISO 8821).
Temperature Monitoring	PTC thermistor, 170°C switch temperature.
Bearing System	Preloaded ball bearings.
Electrical Connections	Connector or hybrid box for power and brake; connector for feedback devices and thermistor.
Flange Mounting	IEC 60072-1 as standard.
Output Shaft	Output key is standard (to IEC 60072-1). Plain shaft is optional.

Environmental

Ingress Protection	Motor fitted with mating connector and cable: IP65. Speed up to 6000 rpm: IP65.
Operating Temperature	Specified performance at 40°C ambient.
Storage Temperature	-20°C to 70°C.
Insulation Class	H (180°C)
Temperature Rise	125°C over ambient of 40°C Max. 100°C over ambient of 40°C Typical.
Relative Humidity	90% Non condensing

Optional Products

CT Dynamics offers a number of products, which add power, flexibility and value to the Unimotor range:



Cable Assemblies

CT Dynamics' cable assemblies simplify motor connection and reduce installation time. Made to order in lengths up to 100 metres, they have a PUR sheath for high resistance to oil, grease and solvents and have an excellent dynamic performance.



Gearmotors

Gearmotors deliver greater torque output whilst maintaining high standards of precision and reliability. They may be mounted in any orientation and are available with single or double stage gearbox options.

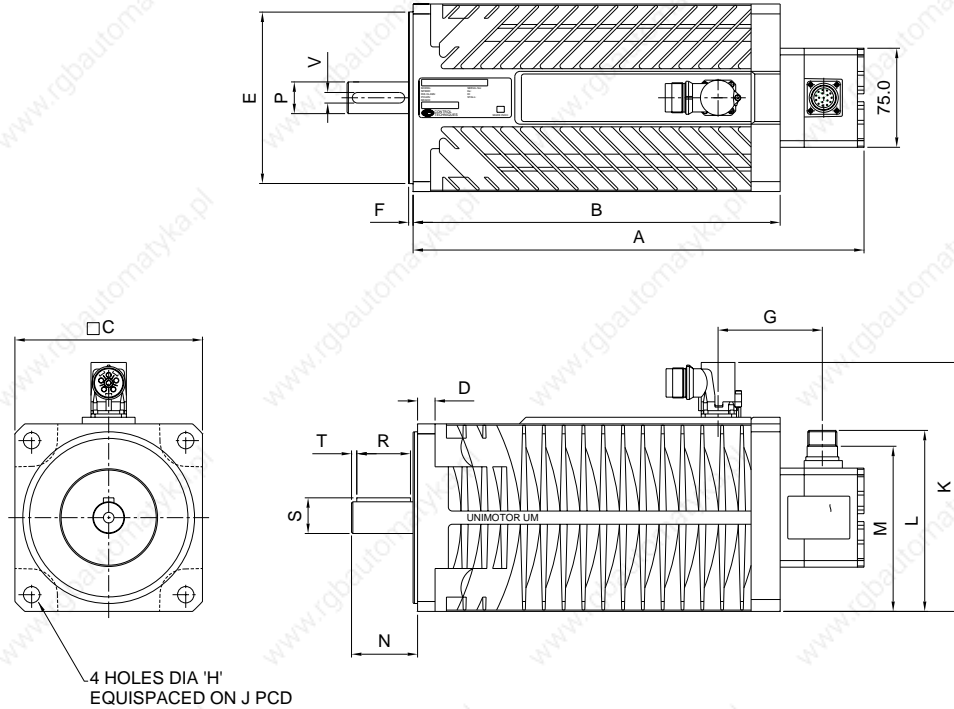


Fan Cowling Kits

Fan cowlings force cool air through the fins on the Unimotor housing to increase torque output by up to 70%. Available to fit all frame sizes, the units, which may be retrofitted, maximise power density in tight places.

For further information please contact CT Dynamics.

Outline Drawings - Frame Sizes 75 - 142



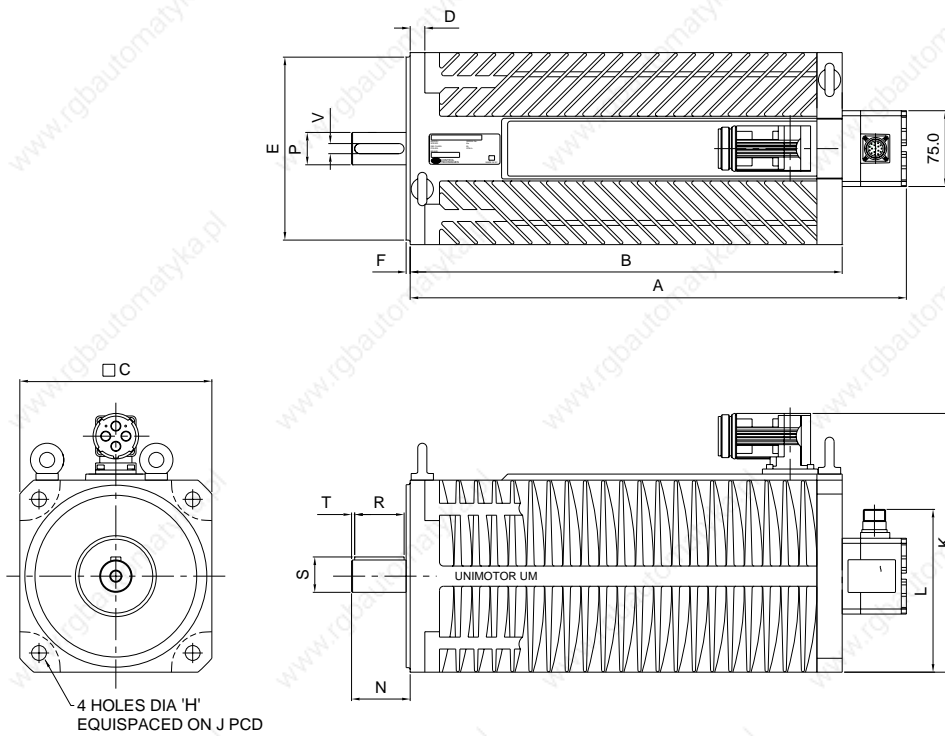
Dimensions - Frame Sizes 75 - 142

FRAME SIZE	75					95					115					142				
Dimension / Length suffix	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
A Length Overall (Unbraked)	211	241	271	301	342	222	252	282	312	342	242	272	302	332	362	225	255	285	315	345
A Length Overall (Braked)	241	271	301	331	372	252	282	312	342	372	272	302	332	362	392	285	315	345	375	405
B Body Length (Unbraked)	146	176	206	236	277	157	187	217	247	277	177	207	237	267	297	160	190	220	250	280
B Body Length (Braked)	176	206	236	266	307	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	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	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	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	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	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	8.0

Outline Drawings - Frame Size 190

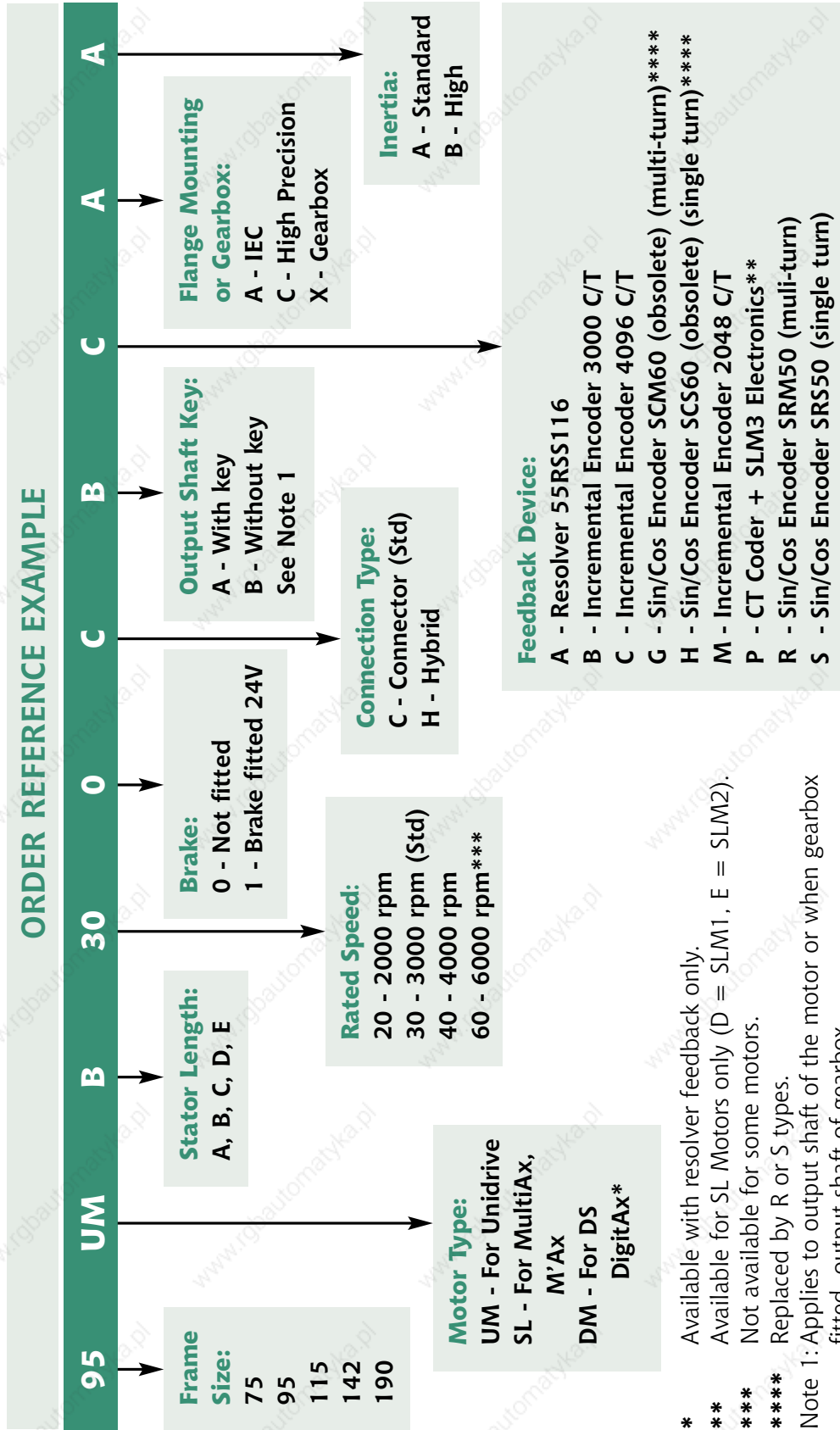


Dimensions - Frame Size 190

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			
H	Fixing Holes Diameter	14.5 (H14)			
J	Fixing Hole p.c.d.	215.0			
K	Overall Height	260.0			
L	Signal Connector Height	161.1			
N	Shaft Length (front)	58.0			
P	Shaft Diameter (front)	32.0			
Shaft Output Key Dimensions (option A)					
R	Shaft Key Length	49.0			
S	Shaft Key Height	35.0			
T	Shaft Key to Shaft End	3.1			
V	Shaft Key Width	10.0			

Ordering Information

Use the information given in the illustration below to create an order code for a Unimotor. The details in the green band are an example of an order reference.



- * Available with resolver feedback only.
 - ** Available for SL Motors only (D = SLM1, E = SLM2).
 - *** Not available for some motors.
 - **** Replaced by R or S types.
- Note 1: Applies to output shaft of the motor or when gearbox fitted, output shaft of gearbox.

Unimotor technical specifications

For 3 Phase VPWM Drives 380 - 480Vrms

v.18M, last updated: 03/03

Unimotors with Encoder Feedback Δt = 100 degC

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

All data subject to +/-10% tolerance

All Speeds	Motor Frame Size (mm)					75					95					115					142					190																				
	Frame Length					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	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	1.2	2.2	3.1	3.9	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	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 (kgcm2)	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	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 (kgcm2)	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	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
Weight (kg)	3.0	3.7	4.4	5.1	5.0	6.1	7.2	8.3	9.5	6.5	8.2	9.9	11.6	13.2	10.9	13.2	15.5	17.8	20.5	26.0	33.0	40.0	48.0	3.0	3.7	4.4	5.1	5.0	6.1	7.2	8.3	9.5	6.5	8.2	9.9	11.6	13.2	10.9	13.2	15.5	17.8	20.5	26.0	33.0	40.0	48.0
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	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	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
Rated Speed 2000 (rpm)																																														
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	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	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	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	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	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
Rated Speed 3000 (rpm)																																														
Kt (Nm/A) 1.6																																														
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	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	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	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)	60.8	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	60.8	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	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
Rated Speed 4000 (rpm)																																														
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	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	▲	▲	▲	N/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	▲	▲	▲	N/A
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	▲	▲	▲	N/A	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	▲	▲	▲	N/A
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	▲	▲	▲	N/A	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	▲	▲	▲	N/A
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	▲	▲	▲	N/A	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	▲	▲	▲	N/A
Rated Speed 6000 (rpm)																																														
Kt (Nm/A) 0.80																																														
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	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	▲	N/A	7.9	13.5	▲	▲	▲	▲	▲	▲	N/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	▲	N/A	7.9	13.5	▲	▲	▲	▲	▲	▲	N/A
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	▲	N/A	1.82	2.83	▲	▲	▲	▲	▲	▲	N/A	0.57	1.01	1.32	1.63	0.82	1.32	1.76	2.07	2.32	1.38	2.51	3.20	▲	N/A	1.82	2.83	▲	▲	▲	▲	▲	▲	N/A
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	▲	N/A	1.42	0.46	▲	▲	▲	▲	▲	▲	N/A	15.0	5.00	2.66	1.90	5.45	1.82	1.05	0.62	0.48	3.10	0.97	0.50	▲	N/A	1.42	0.46	▲	▲	▲	▲	▲	▲	N/A
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	▲	N/A	7.72	3.44	▲	▲	▲	▲	▲	▲	N/A	24.0	10.6	6.80	4.80	14.1	6.00	3.80	2.70	2.10	15.5	4.81	2.94	▲	N/A	7.72	3.44	▲	▲	▲	▲	▲	▲	N/A

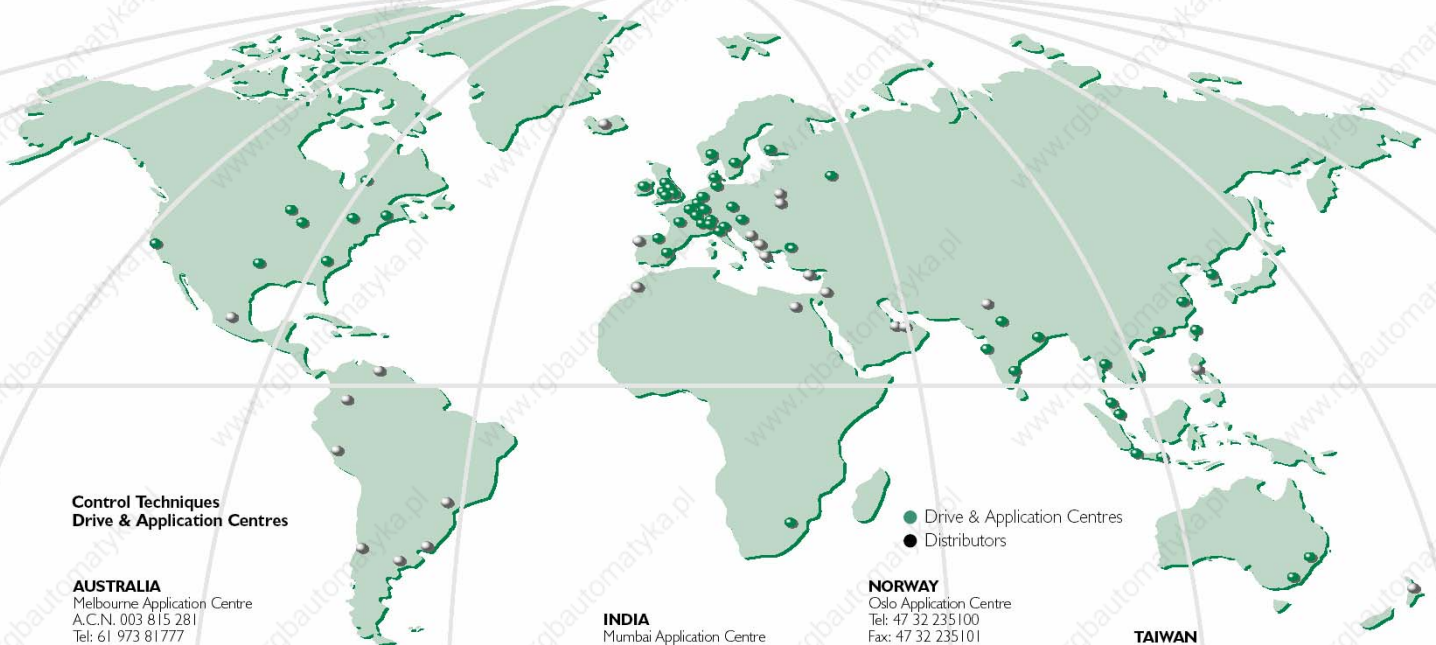
The information contained in this specification is for guidance only and does not form part of any contract.

CT Dynamics Limited have an ongoing process of development and reserve the right to change the specification without notice.

▲ Consult factory

N/A Not available

Driving the world...



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