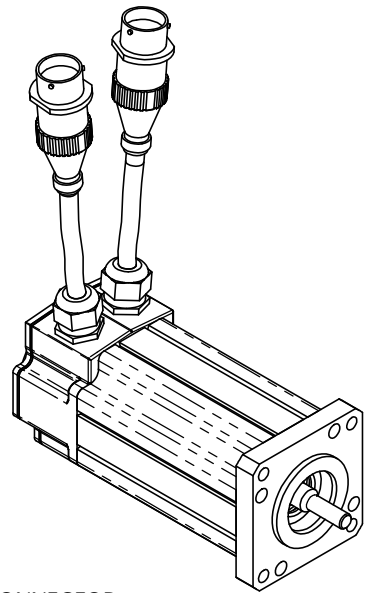


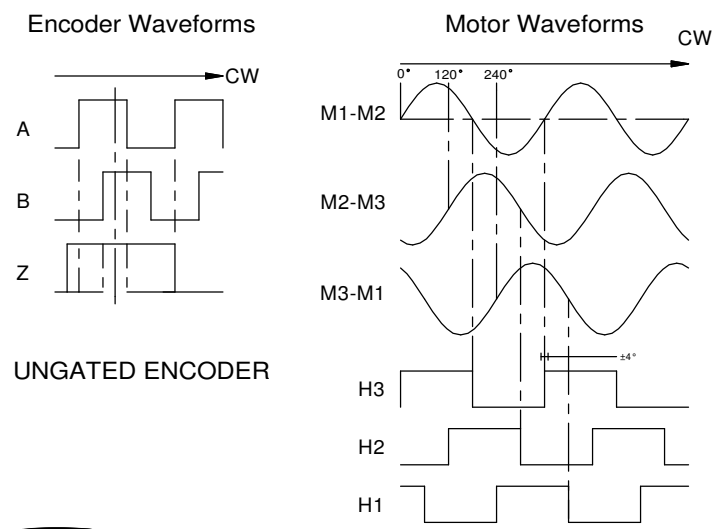
## Rockwell N-Series to MDM N-Series Replacement Conversion Table

Description	Rockwell N-Series P/N	MDM N-Series P/N	MDM Dwg	Speed-Torque Curve	MDM N-Series Motor Configuration File			
					UltraMaster (Ultra 100/200)	Download	UltraWare (Ultra 3000)	Download
Motor, 1000 Line Encoder	N-2302-1-F00AA	T0601T0104	<a href="#">33030-004</a>	<a href="#">T0601T0</a>	T0601T0NSeriesMaster(N2302).mtr		T0601T0NSeriesWare(N2302).mxf	
Motor-24V Brake, 1000 Line Encoder	N-2302-1-F04AA	T0601T0105	Call Factory					
Motor, 1000 Line Encoder	N-2304-1-F00AA	T0601B8100	<a href="#">33030-004</a>	<a href="#">T0601B8</a>	T0601B8NSeriesMaster(N2304).mtr		T0601B8NSeriesWare(N2304).mxf	
Motor-24V Brake, 1000 Line Encoder	N-2304-1-F04AA	T0601B8101	Call Factory					
Motor, 2000 Line Encoder	N-3406-2-H00AA	T0851A0109	<a href="#">31030-078</a>	<a href="#">T0851A0</a>	T0851A0NSeriesMaster(N3406).mtr		T0851A0NSeriesWare(N3406).mxf	
Motor-24V Brake, 2000 Line Encoder	N-3406-2-H04AA	T0851A0110	Call Factory					
Motor, 2000 Line Encoder	N-3412-2-H00AA	T0851C0103	<a href="#">31030-078</a>	<a href="#">T0851C0</a>	T0851C0NSeriesMaster(N3412).mtr		T0851C0NSeriesWare(N3412).mxf	
Motor-24V Brake, 2000 Line Encoder	N-3412-2-H04AA	T0851C0106	Call Factory					
Motor, 2000 Line Encoder	N-4214-2-H00AA	T1101D0102	<a href="#">32030-047</a>	<a href="#">T1101D0</a>	T1101D0NSeriesMaster(N4214).mtr		T1101D0NSeriesWare(N4214).mxf	
Motor-24V Brake, 2000 Line Encoder	N-4214-2-H04AA	T1101D0103	Call Factory					
Motor, 2000 Line Encoder	N-4220-2-H00AA	T1101C6100	<a href="#">32030-047</a>	<a href="#">T1101C6</a>	T1101C6NSeriesMaster(N4220).mtr		T1101C6NSeriesWare(N4220).mxf	
Motor-24V Brake, 2000 Line Encoder	N-4220-2-H04AA	T1101C6101	Call Factory					
Motor, 2000 Line Encoder	N-5630-2-H00AA	T1101D3100	<a href="#">32030-050</a>	<a href="#">T1101D3</a>	T1101D3NSeriesMaster(N5630).mtr		T1101D3NSeriesWare(N5630).mxf	
Motor-24V Brake, 2000 Line Encoder	N-5630-2-H04AA	T1101D3101	Call Factory					
Motor, 2000 Line Encoder	N-5637-2-H00AA	T1102E0103	<a href="#">32030-052</a>	<a href="#">T1102E0</a>	T1102E0NSeriesMaster(N5637).mtr		T1102E0NSeriesWare(N5637).mxf	
Motor-24V Brake, 2000 Line Encoder	N-5637-2-H04AA	T1102E0103	Call Factory					
Motor, 2000 Line Encoder	N-5647-2-H00AA	T1102G3100	<a href="#">32030-052</a>	<a href="#">T1102G3</a>	T1102G3NSeriesMaster(N5647).mtr		T1102G3NSeriesWare(N5647).mxf	
Motor-24V Brake, 2000 Line Encoder	N-5647-2-H04AA	T1102G3101	Call Factory					

REVISIONS				
REV	ECN	DESCRIPTION	DATE	APP'D
A	DR8319	RELEASED	11/8/06	T.M.
B	ECN3230	WAS 33030-004-007, IS 33030-004, NOTES ADDED	07/03/07	J.S.



Clockwise rotation, viewed from the motor shaft, results in these waveforms.

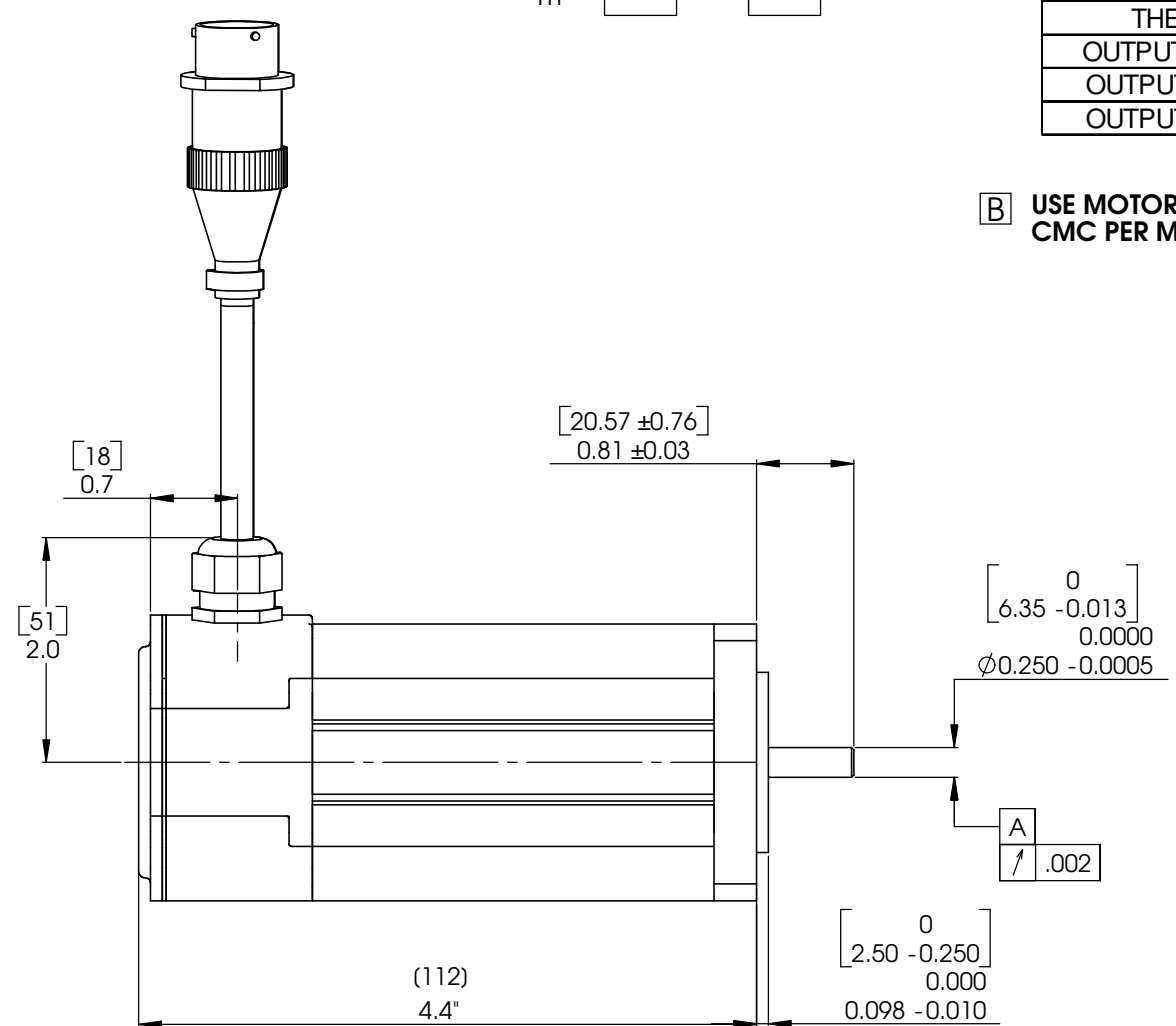
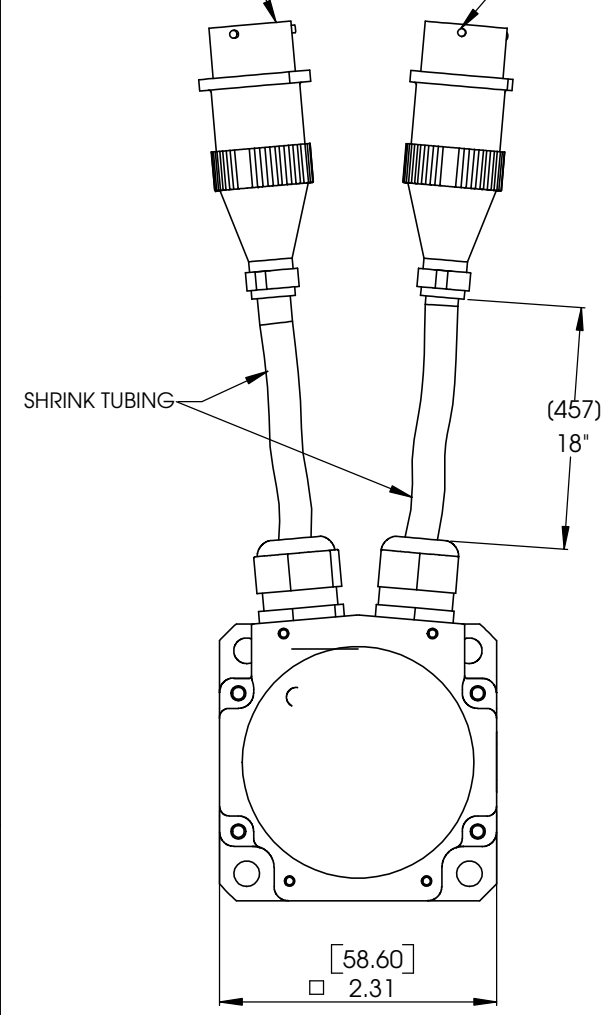


ENCODER CONN WIRING CODE	
FROM	TO PIN
OUTPUT A	A
OUTPUT A'	B
OUTPUT B	C
OUTPUT B'	D
OUTPUT Z	E
OUTPUT Z'	F
CASE GROUND	G
N/C	H
+ 5 VDC	J
+ 5 VDC	K
COMMON	L
COMMON	M
N/C	N
N/C	P
THERM	R
THERM	S
OUTPUT W (H1)	T
OUTPUT U (H3)	U
OUTPUT V (H2)	V

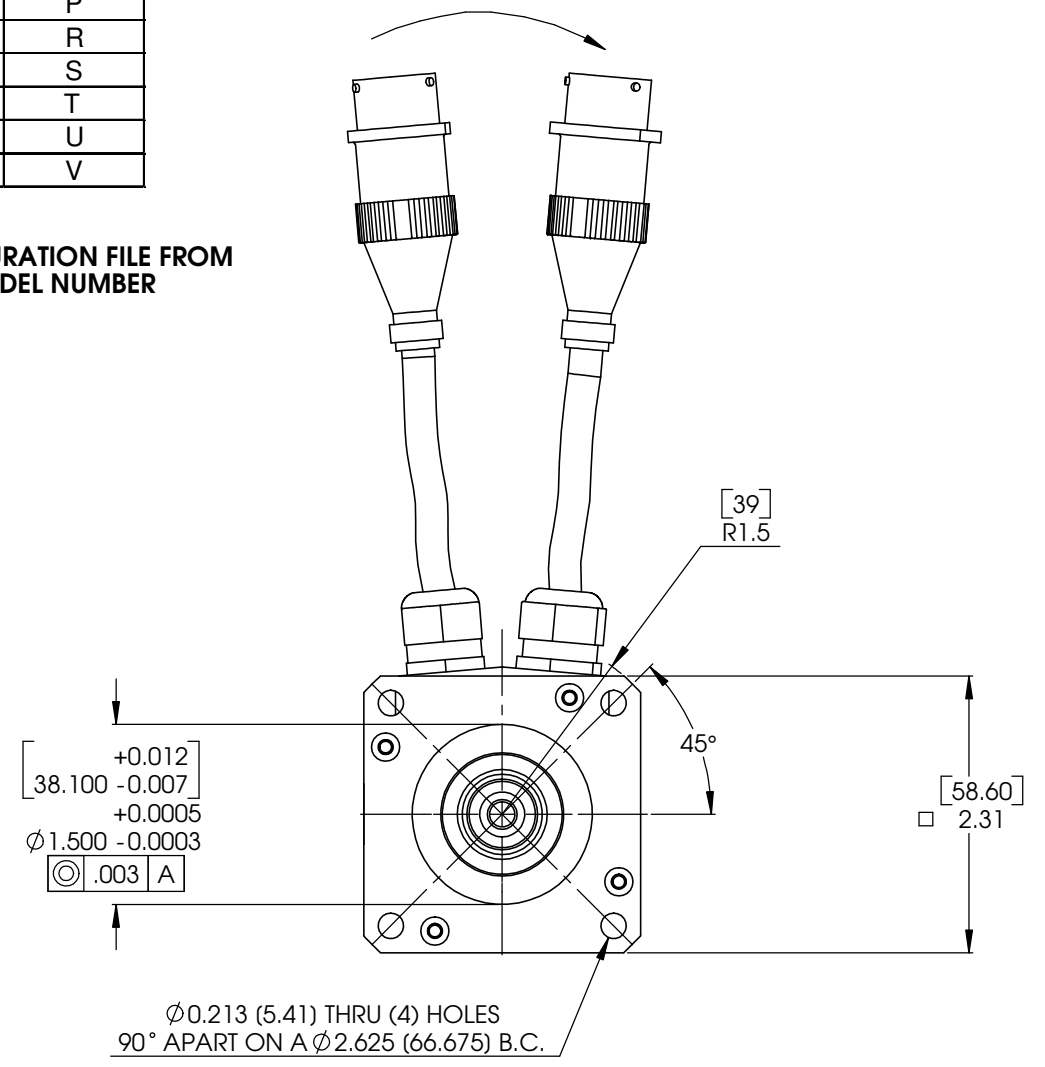
MOTOR CONN. WIRING CODE	
FROM	TO PIN
MOTOR M1	A
MOTOR M2	B
MOTOR M3	C
CASE	D
N/C	E

NOTE:  
TEMPERATURE SENSOR:  
CONTACTS: NORMALLY CLOSED  
MAX AMPS: 6 AMP  
RATED VOLTAGE: 24VDC

POWER CONNECTOR KPSE01F14-SP-A71  
ENCODER CONNECTOR KPSE01F14-19P-A71



**B** USE MOTOR CONFIGURATION FILE FROM CMC PER MOTOR MODEL NUMBER



NOTES:  
1. ROTATION: CLOCKWISE MOTOR ROTATION VIEWING DRIVE END OCCURS WHEN PHASE A LEADS PHASE B, PHASE B LEADS PHASE C.

**B** FRAME: T0601 WITH NEMA 23 FLANGE

DIMENSIONS IN BRACKETS (DUAL) ARE IN MILLIMETERS

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	THIRD ANGLE PROJECTION THIRD ANGLE PROJECTION	ANGLES UNLESS OTHERWISE SPECIFIED UNLESS OTHERWISE SPECIFIED UNLESS OTHERWISE SPECIFIED	
DATE 9/26/06	DRAWN MEZHER	CHECKED APPROVED	DWG. NO. 33030-004

CAD GENERATED DRAWING. DO NOT MANUALLY UPDATE.

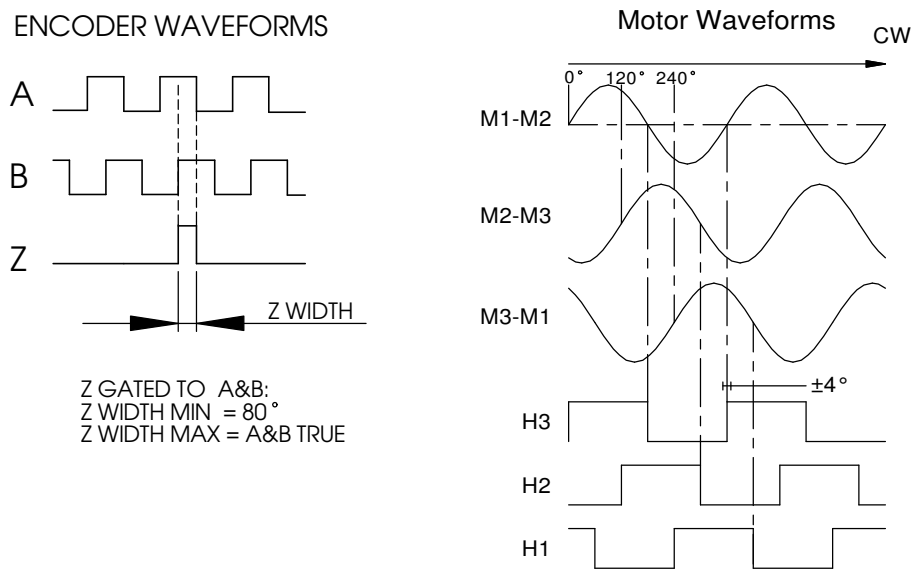
CAD FILE: 33030-004.SDDRW





REVISIONS				
REV	ECN	DESCRIPTION	DATE	APP'D
A	DR8374	RELEASED	1/25/07	T.M.
B	ECN3064	ENCODER WAVEFORM BLOCK REPLACED	02/15/07	J.S.
C	ECN3230	MOTOR CONFIG. & NEMA NOTE ADDED	07/03/07	J.S.

Clockwise rotation, viewed from the motor shaft, results in these waveforms.

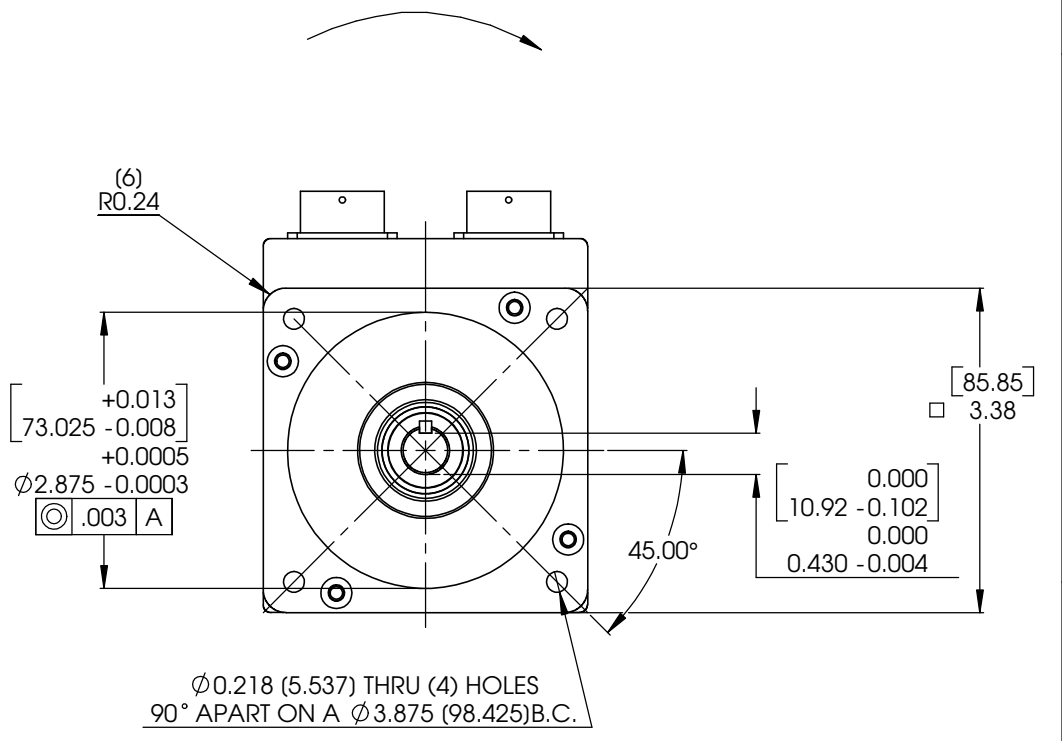
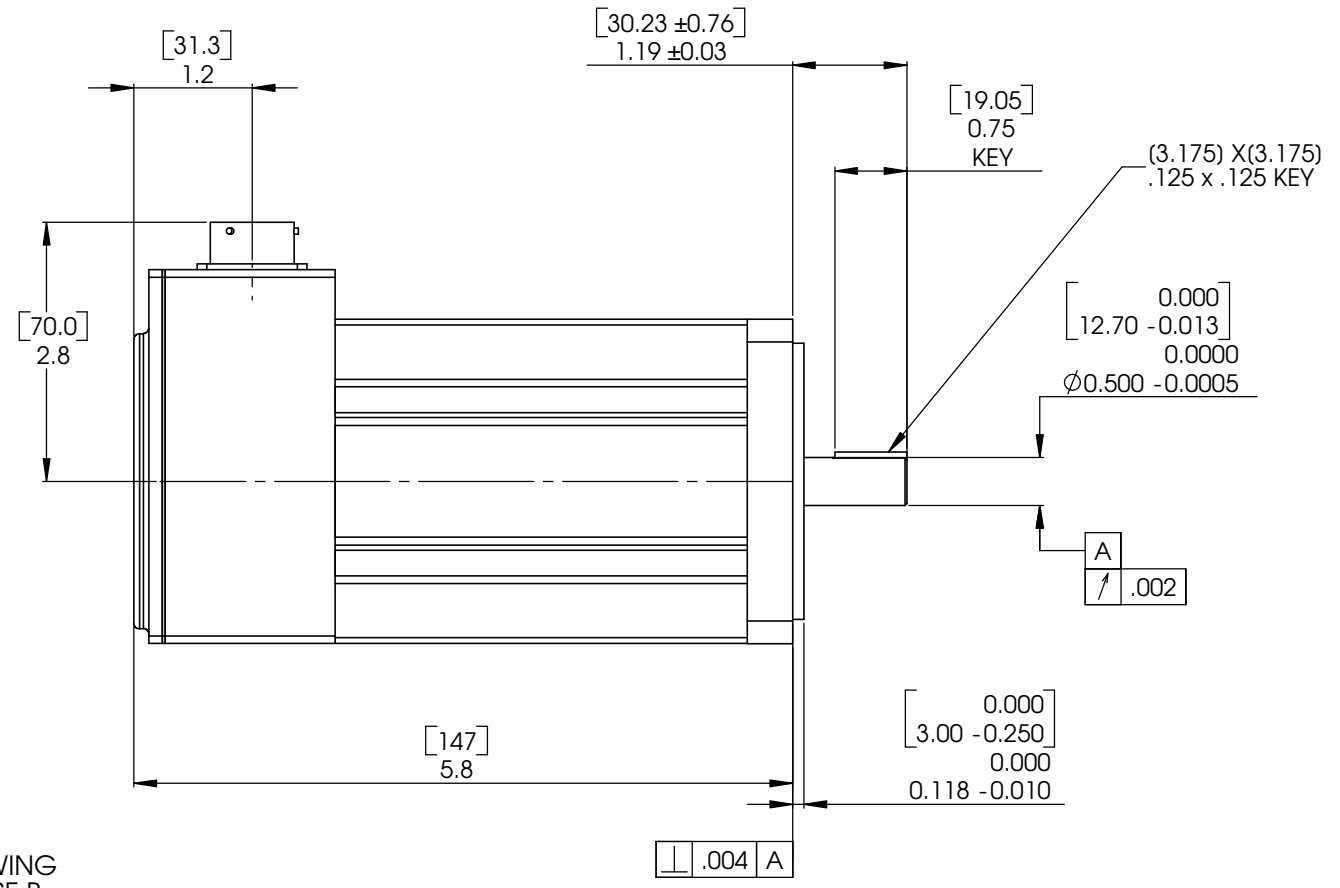
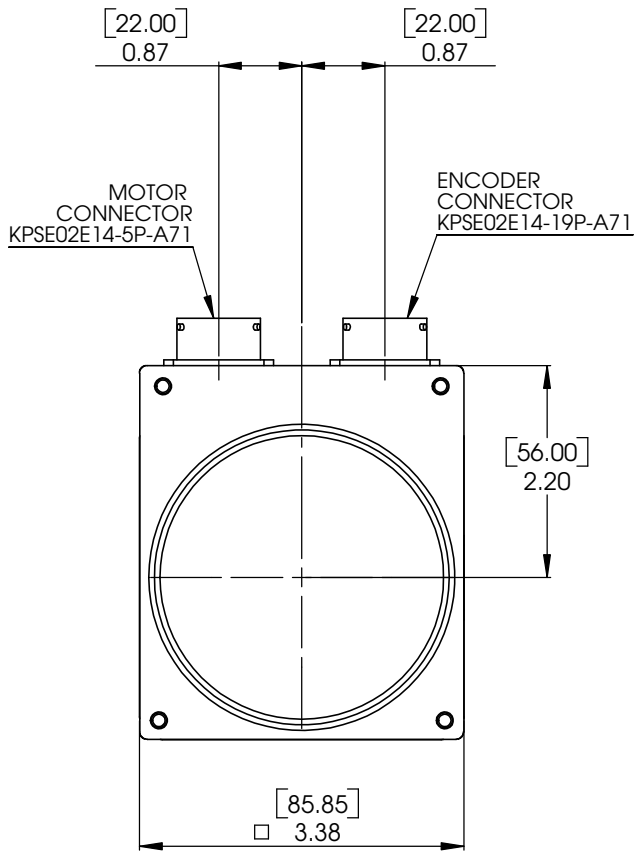
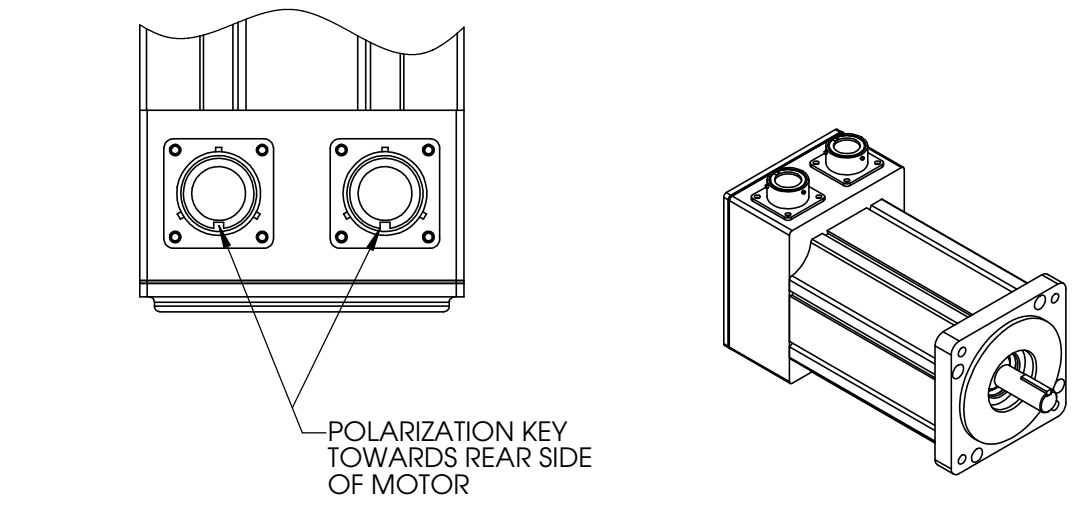


ENCODER CONN WIRING CODE	
FROM	TO PIN
OUTPUT A	A
OUTPUT A'	B
OUTPUT B	C
OUTPUT B'	D
OUTPUT Z	E
OUTPUT Z'	F
CASE GROUND	G
N/C	H
+5 VDC	J
+5 VDC	K
COMMON	L
COMMON	M
N/C	N
N/C	P
THERMOSTAT	R
THERMOSTAT	S
OUTPUT H1	T
OUTPUT H3	U
OUTPUT H2	V

MOTOR CONN. WIRING CODE	
FROM	TO PIN
MOTOR M1	A
MOTOR M2	B
MOTOR M3	C
CASE	D

NOTE:  
TEMPERATURE SENSOR:  
CONTACTS: NORMALLY CLOSED  
MAX AMPS: 6 AMP  
RATED VOLTAGE: 24VDC

USE MOTOR CONFIGURATION FILE FROM CMC PER MOTOR MODEL NUMBER



- NOTES:
1. ROTATION: CLOCKWISE MOTOR ROTATION VIEWING DRIVE END OCCURS WHEN PHASE A LEADS PHASE B, PHASE B LEADS PHASE C.
  2. THE INDEX PULSE OCCURS WHEN FACING THE MOTOR, THE SHAFT KEYWAY IS ORIENTED 90° ± 10° CLOCLWISE (MECHANICAL) AWAY FROM THE CONNECTORS

FRAME: T0851 WITH NEMA 34 FLANGE

DIMENSIONS IN BRACKETS (DUAL) ARE IN MILLIMETERS

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	THIRD ANGLE PROJECTION 	ANGLES UNLESS OTHERWISE SPECIFIED UNLESS OTHERWISE SPECIFIED UNLESS OTHERWISE SPECIFIED	
CAD GENERATED DRAWING. DO NOT MANUALLY UPDATE.	MATERIAL: N/A FINISH: N/A	SCALE: 1:1	SHEET 1 OF 1

ENTER DRIVE LETTER BELOW( S for Sine, T for Trap)

s

ENTER UNIT LETTER BELOW( M for SI, E for English)

m

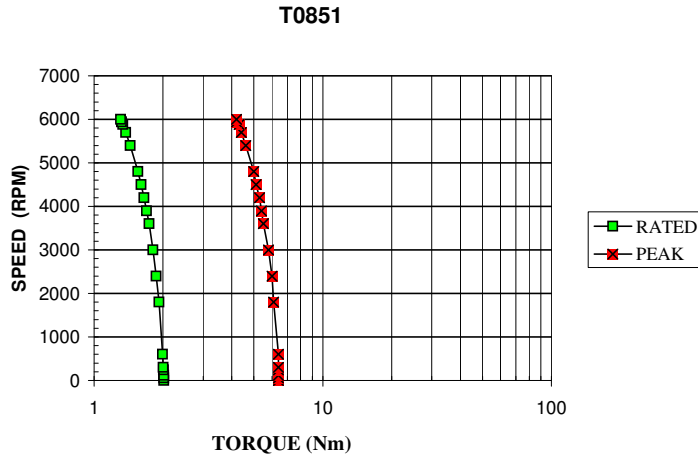
SELECT WINDING FROM DROP DOWN LIST

Kc = A0(Kc = 20 Vpk/krpm)

MODE NUMBER

CHECKED:	SD	T0851		A0(Kc = 20 Vpk/krpm)	DRAWN:	AR
all values at 25 deg c unless stated otherwise				STD	CUST	APPROVED:
<b>TORQUE &amp; CURRENT AT 40 Deg C AMBIENT</b>				YES		SD
<b>^SPECIFICATIONS</b>						
Symbol	Units	NOM	MIN	MAX		
Tpk	Torque,peak stall	Nm		6.4		
Tc	Torque,continuous stall	Nm	2.02	1.82	2.22	
Ktp	Torque sensitivity ( L TO L )	Nm/Apeak	0.165	0.149	0.182	
Kt	Torque sensitivity ( L TO L )	Nm/Arms	0.234	0.211	0.257	
Ra	Armature resistance ( L TO L )	ohms	0.36	0.31	0.41	
La	Armature inductance ( L TO L )	millihenry	1.9	1.33	2.47	
Ip	Amps at Tpk	Apeak	38.9	35.0	42.8	
Isp	Amps at Tc stall	Apeak	14.37	12.93	15.81	
Is	Amps at Tc stall	Arms	10.16	9.14	11.18	
Kep	Back EMF constant	Vpeak/Krpm	20.00	18.00	22.00	
Ke	Back EMF constant	Vrms/Krpm	14.14	12.73	15.55	
Kep	Back EMF constant	Vpeak/rad/sec	0.191	0.149	0.182	
Ke	Back EMF constant	Vrms/rad/sec	0.135	0.122	0.149	
Ep	Volts @ Tpk	Vpeak	14.00			
Fi	Viscous friction	Nm/Krpm	0.009			
Tf	Static friction torque	Nm	0.019			
Ec	volts @ Tc	Vpeak	7.760			
Jm	Moment of inertia	Kg-cm2	0.7345			
Tm	Time constant,mech	milliseconds	0.72			
Te	Time constant,elect	milliseconds	5.28			
Rth	Thermal resistance	deg C/watt	1.35			
Tth	Time constant,thermal	minutes	20			
Oa	Max armature temp	deg C		155	MOTOR IS MOUNTED ON A 254 mmx254 mmx6.35 mm ALUMINUM PLATE IN A 40 DEG.C AMBIENT	
Km	Figure of Merit	Nm/(amp-ohm)	0.28		SPEED/ TORQUE CURVE SHOWN IS RATED. TYPICAL VALUES ARE WITH IN +/- 10% OF RATING	
Nls	Max operating speed	rpmmax		6000	<b>OTHER SPECIFICATIONS</b>	
	# of motor pole		8		REV(Dt)	Description
Wt	weight	Kg	2.8		A(11/11/05)	Initial release
					B(2/8/06)	Add RMS Kt and Ke
					C(3/20/06)	Add # of poles and reconfigured speedtorque
					D(4/6/06)	Sine SI Ke values corrected

**SINUSOIDAL DRIVE**



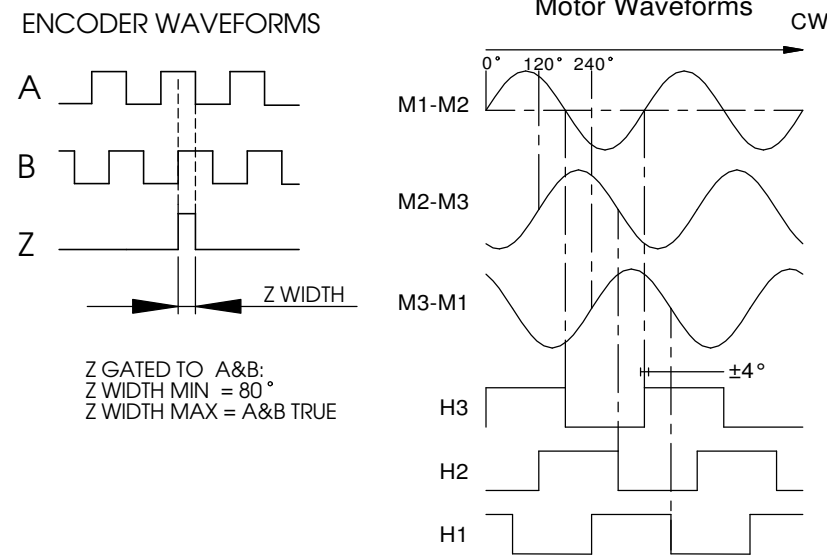
RPM	Trated Nm	Peak Voltage	Peak Current	RMS Current	Watts
0	2.020	7.8	14.37	10.16	84
300	2.009	13.7	14.29	10.10	157
600	1.996	19.7	14.20	10.04	229
1200	1.963	31.5	13.96	9.87	369
1800	1.922	43.4	13.67	9.67	502
2400	1.871	55.2	13.31	9.41	625
3000	1.810	66.9	12.87	9.10	736
3600	1.738	78.7	12.36	8.74	833
4200	1.654	90.4	11.76	8.32	912
4800	1.556	102.0	11.07	7.83	970
5400	1.441	113.5	10.25	7.25	1002
6000	1.306	125.0	9.29	6.57	1001

Rated Speed	Rated Torque
6000	1.3
Rated watts 822	



REVISIONS				
REV	ECN	DESCRIPTION	DATE	APP'D
A	DR8318	RELEASED	11/1/06	T.M.
B	ECN3230	ADDED CONFIG AND FRAME NOTES	07/03/07	J.S.

Clockwise rotation, viewed from the motor shaft, results in these waveforms.

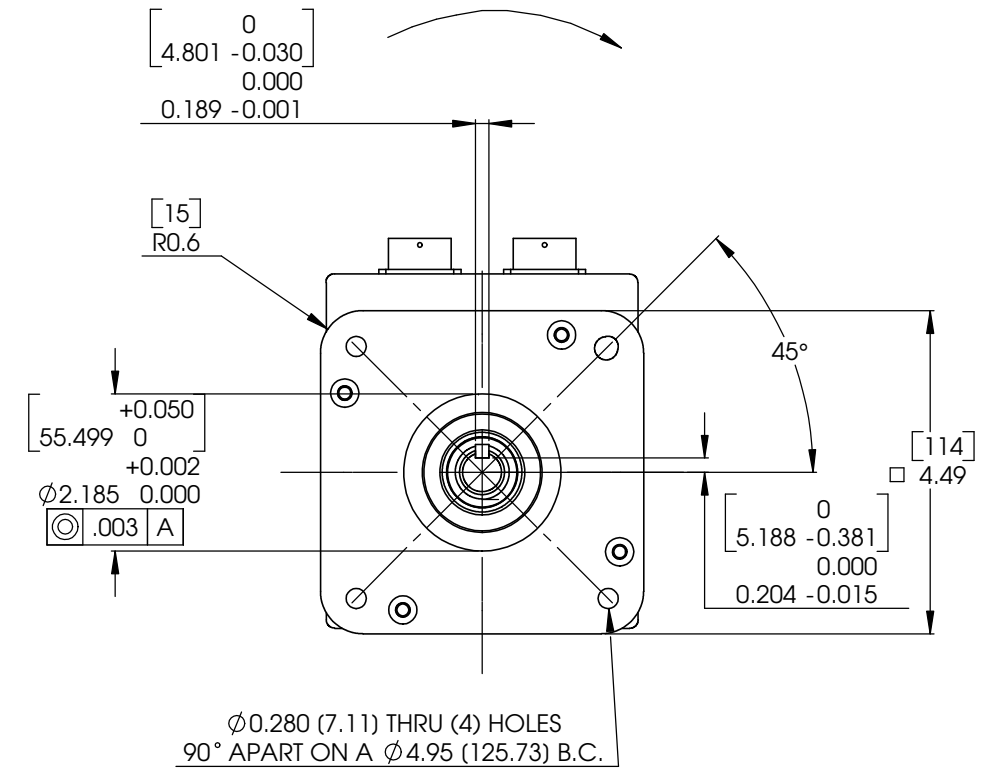
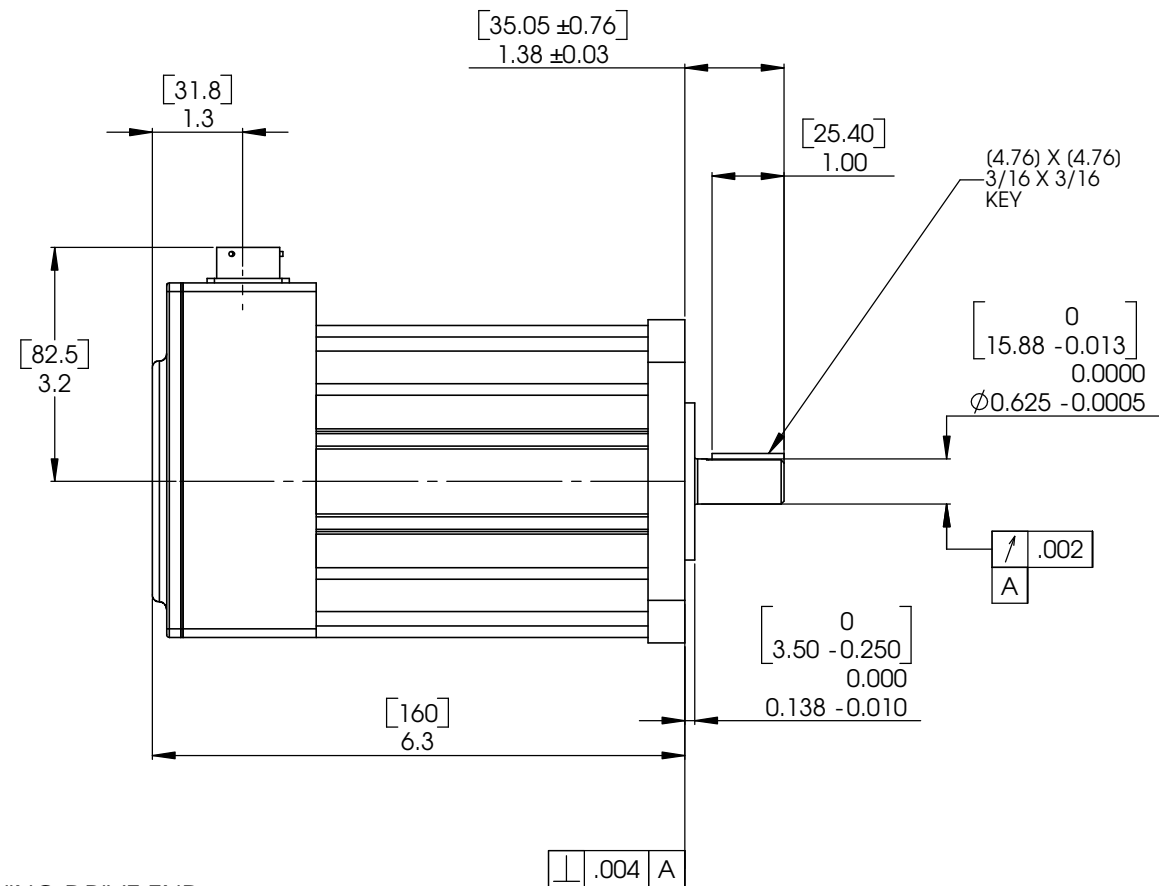
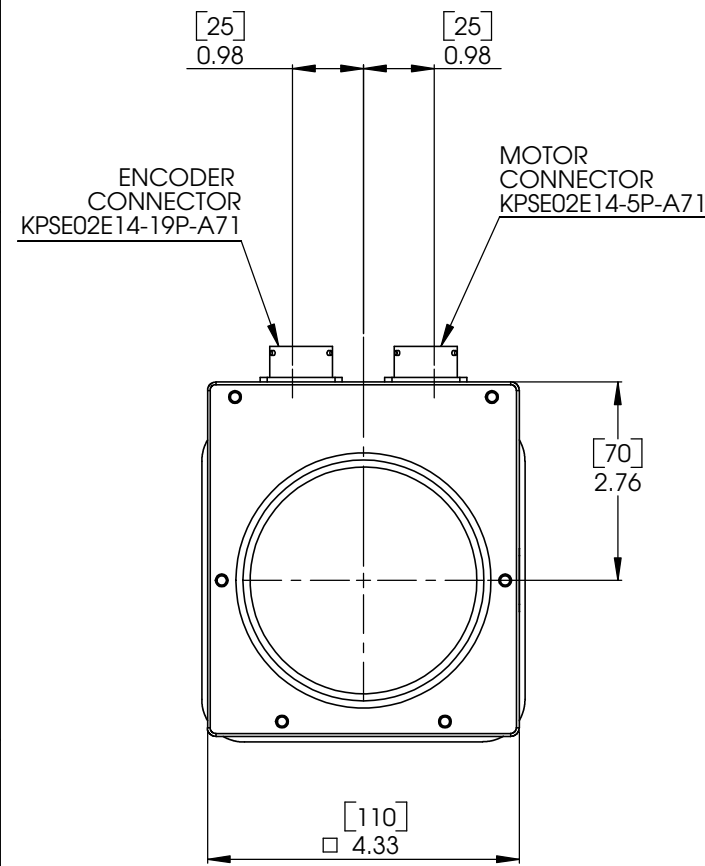
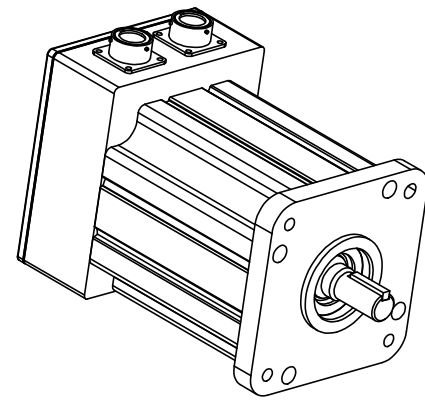
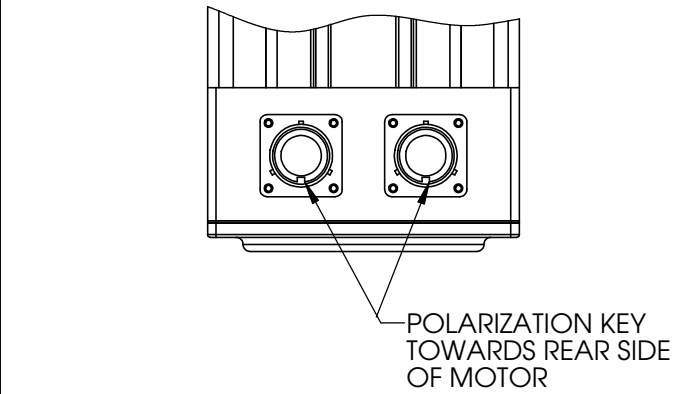


ENCODER CONN WIRING CODE	
FROM	TO PIN
OUTPUT A	A
OUTPUT A'	B
OUTPUT B	C
OUTPUT B'	D
OUTPUT Z	E
OUTPUT Z'	F
CASE GROUND	G
N/A	H
+ 5 VDC	J
+ 5 VDC	K
COMMON	L
COMMON	M
N/A	N
N/A	P
THERMOSTAT	R
THERMOSTAT	S
OUTPUT W (H1)	T
OUTPUT U (H3)	U
OUTPUT V (H2)	V

MOTOR CONN. WIRING CODE	
FROM	TO PIN
MOTOR M1	A
MOTOR M2	B
MOTOR M3	C
CASE	D

NOTE:  
TEMPERATURE SENSOR CONTACTS: NORMALLY CLOSED  
MAX AMPS: 6 AMP  
RATED VOLTAGE: 24VDC

**B** USE MOTOR CONFIGURATION FILE FROM CMC PER MOTOR MODEL NUMBER



NOTES:

1. ROTATION: CLOCKWISE MOTOR ROTATION VIEWING DRIVE END OCCURS WHEN PHASE A LEADS PHASE B, PHASE B LEADS PHASE C.
2. THE INDEX PULSE OCCURS WHEN FACING THE MOTOR, THE SHAFT KEYWAY IS ORIENTED 90° ± 10° CLOCKWISE (MECHANICAL) FROM CONNECTORS.

**B** FRAME: T1101 WITH NEMA 42 FLANGE

DIMENSIONS IN BRACKETS (DUAL) ARE IN MILLIMETERS

NOTICE		MILLIMETERS (mm) TOLERANCES UNLESS OTHERWISE SPECIFIED		APPLICATION	
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		XX	±1.025		110mm
		XXX	±1.030		
THIRD ANGLE PROJECTION		ANGLES	±1.0-30	DRAWN	T. MEZHER 1/25/07
TEMPERATURE SENSORS IN MILLIMETERS (mm) MUST BE USED WITH APPROPRIATE INTERFACING AND TOI. PER ASME Y14.24-1994.		MATERIAL	N/A	CHECKED	
		FINISH	N/A	APPROVED	

CAD GENERATED DRAWING. DO NOT MANUALLY UPDATE.

<b>CMC</b> Cleveland Motion Controls An Ingersoll Rand Company Torque Systems Division	
TITLE: OUTLINE N-4214, N-4220 ELECTROCRRAFT REPLACEMENT	
REV: D	DWG. NO.: 32030-047
SCALE: 1:1	SHEET 1 OF 1

CAD FILE: 32030-047.SUDDRW



ENTER DRIVE LETTER BELOW( S for Sine, T for Trap)

s

ENTER UNIT LETTER BELOW( M for SI, E for English)

m

SELECT WINDING FROM DROP DOWN LIST

Ke = D0(Ke = 50 Vpk/krpm)

CHECKED:		SD		
all values at 25 deg c unless stated otherwise				
<b>TORQUE &amp; CURRENT AT 40 Deg C AMBIENT</b>				
^SPECIFICATIONS				
Symbol	Units	NOM	MIN	MAX
Tpk Torque,peak stall	Nm			12.0
Tc Torque,continuous stall	Nm	4.85	4.37	5.34
Ktp Torque sensitivity ( L TO L )	Nm/Apeak	0.413	0.372	0.454
Kt Torque sensitivity ( L TO L )	Nm/Arms	0.585	0.527	0.644
Ra Armature resistance ( L TO L )	ohms	1.04	0.88	1.20
La Armature inductance ( L TO L )	millihenry	5	3.50	6.50
Ip Amps at Tpk	Apeak	29.0	26.1	31.9
Isp Amps at Tc stall	Apeak	13.79	12.41	15.17
Is Amps at Tc stall	Arms	9.75	8.78	10.73
Ke <sub>p</sub> Back EMF constant	Vpeak/Krpm	<b>50.00</b>	45.00	55.00
Ke <sub>r</sub> Back EMF constant	Vrms/Krpm	<b>35.36</b>	31.82	38.90
Ke <sub>l</sub> Back EMF constant	Vpeak/rad/sec	0.478	0.372	0.454
Ke <sub>r</sub> Back EMF constant	Vrms/rad/sec	0.338	0.304	0.372
Ep Volts @ Tpk	Vpeak	30.16		
Fi Viscous friction	Nm/Krpm	0.031		
Tf Static friction torque	Nm	0.034		
Ec volts @ Tc	Vpeak	21.512		
Jm Moment of inertia	Kg-cm <sup>2</sup>	2.37288		
Tm Time constant,mech	milliseconds	1.08		
Te Time constant,elect	milliseconds	4.81		
Rth Thermal resistance	deg C/watt	0.51		
Tth Time constant,thermal	minutes	25		
Oa Max armature temp	deg C			155
Km Figure of Merit	Nm/(amp-ohm)	0.406		
Nls Max operating speed	rpmmax			6000
# of motor poles		8		
Wt weight	Kg	4.9		

MODE/NUMBER

<b>T1101 D0(Ke = 50 Vpk/krpm)</b>		DRAWN:	AR
		APPROVED:	SD
		STD	CUST
		YES	

**T1101**

MOTOR IS MOUNTED ON A 304.8 mmx304.8 mmx12.7 mm ALUMINUM PLATE IN A 40 DEG.C AMBIENT  
SPEED/ TORQUE CURVE SHOWN IS RATED. TYPICAL VALUES ARE WITH IN +/- 10% OF RATING

OTHER SPECIFICATIONS	
REV(Dt)	Description
A(11/11/05)	Initial Release
B(2/10/06)	Add RMS Kt and Ke
C(3/20/06)	Add # of poles
D(4/6/06)	Sine SI Ke values corrected
E(2/20/07)	Add C6 and D3 winding
F(5/07/07)	Reconfigured speed/torque

RPM	Trated Nm	Peak Voltage	Peak Current	RMS Current	Watts
0	4.845	21.5	13.79	9.75	222
300	4.821	36.4	13.72	9.70	398
600	4.791	51.3	13.63	9.64	572
1200	4.711	80.9	13.41	9.48	907
1800	4.605	110.4	13.10	9.26	1221
2400	4.471	139.8	12.72	8.99	1510
3000	4.306	169.1	12.25	8.66	1766
3600	4.108	198.2	11.69	8.27	1983
4200	3.871	227.2	11.02	7.79	2146
4800	3.590	255.9	10.22	7.23	2247
5400	3.255	284.4	9.26	6.55	2266
6000	2.847	312.6	8.10	5.73	2182

Rated Speed	Rated Torque
5400	3.3
Rated watts 1844	

SINUSOIDAL DRIVE

ENTER DRIVE LETTER BELOW( S for Sine, T for Trap)

s

ENTER UNIT LETTER BELOW( M for SI, E for English)

m

SELECT WINDING FROM DROP DOWN LIST

Ke = C6(Ke = 34 Vpk/krpm)

CHECKED:		SD		
all values at 25 deg c unless stated otherwise				
<b>TORQUE &amp; CURRENT AT 40 Deg C AMBIENT</b>				
^SPECIFICATIONS				
Symbol	Units	NOM	MIN	MAX
Tpk Torque,peak stall	Nm			12.0
Tc Torque,continuous stall	Nm	5.07	4.56	5.58
Ktp Torque sensitivity ( L TO L )	Nm/Apeak	0.281	0.253	0.309
Kt Torque sensitivity ( L TO L )	Nm/Arms	0.398	0.358	0.438
Ra Armature resistance ( L TO L )	ohms	.44	0.37	0.51
La Armature inductance ( L TO L )	millihenry	2.3	1.61	2.99
Ip Amps at Tpk	Apeak	42.6	38.3	46.9
Isp Amps at Tc stall	Apeak	21.20	19.08	23.32
Is Amps at Tc stall	Arms	14.99	13.49	16.49
Ke <sub>p</sub> Back EMF constant	Vpeak/Krpm	<b>34.00</b>	30.60	37.40
Ke <sub>r</sub> Back EMF constant	Vrms/Krpm	<b>24.05</b>	21.65	26.46
Ke <sub>l</sub> Back EMF constant	Vpeak/rad/sec	0.325	0.253	0.309
Ke <sub>r</sub> Back EMF constant	Vrms/rad/sec	0.230	0.207	0.253
Ep Volts @ Tpk	Vpeak	18.74		
Fi Viscous friction	Nm/Krpm	0.031		
Tf Static friction torque	Nm	0.034		
Ec volts @ Tc	Vpeak	13.992		
Jm Moment of inertia	Kg-cm <sup>2</sup>	2.37288		
Tm Time constant,mech	milliseconds	0.99		
Te Time constant,elect	milliseconds	5.23		
Rth Thermal resistance	deg C/watt	0.51		
Tth Time constant,thermal	minutes	25		
Oa Max armature temp	deg C			155
Km Figure of Merit	Nm/(amp-ohm)	0.424		
Nls Max operating speed	rpmmax			6000
# of motor poles		8		
Wt weight	Kg	4.9		

MODE/NUMBER

<b>T1101 C6(Ke = 34 Vpk/krpm)</b>		DRAWN:	AR
STD	CUST	APPROVED:	
YES		SD	
<b>T1101</b>			
MOTOR IS MOUNTED ON A 304.8 mmx304.8 mmx12.7 mm ALUMINUM PLATE IN A 40 DEG.C AMBIENT			
SPEED/ TORQUE CURVE SHOWN IS RATED. TYPICAL VALUES ARE WITH IN +/- 10% OF RATING			
<b>OTHER SPECIFICATIONS</b>			
		REV(Dt)	Description
		A(11/11/05)	Initial Release
		B(2/10/06)	Add RMS Kt and Ke
		C(3/20/06)	Add # of poles
		D(4/6/06)	Sine SI Ke values corrected
		E(2/20/07)	Add C6 and D3 winding
		F(5/07/07)	Reconfigured speed/torque

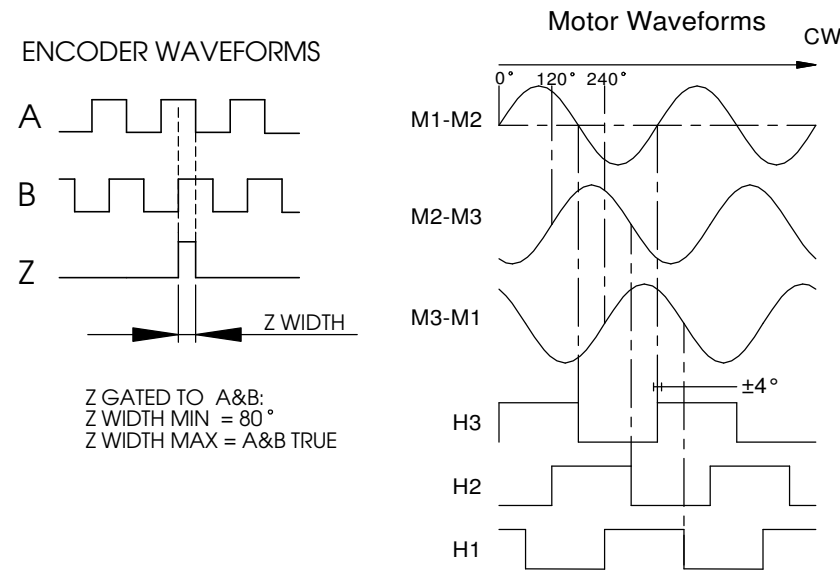
**SINUSOIDAL DRIVE**

RPM	Trated Nm	Peak Voltage	Peak Current	RMS Current	Watts
0	5.066	14.0	21.20	14.99	222
300	5.042	24.1	21.10	14.92	407
600	5.011	34.2	20.97	14.83	588
1200	4.928	54.4	20.62	14.58	939
1800	4.818	74.5	20.16	14.26	1270
2400	4.678	94.5	19.58	13.85	1574
3000	4.507	114.4	18.86	13.34	1843
3600	4.301	134.3	18.00	12.73	2069
4200	4.054	154.0	16.97	12.00	2241
4800	3.762	173.6	15.74	11.13	2347
5400	3.411	193.0	14.27	10.09	2370
6000	2.986	212.3	12.50	8.84	2286

Rated Speed	Rated Torque
5400	3.4
Rated watts 1932	

REVISIONS				
REV	ECN	DESCRIPTION	DATE	APP'D
A	DR8318	RELEASED	11/1/06	T.M.
B	ECN3230	ADDED MTR CONFIG AND FRAME NOTES	07/03/07	J.S.

Clockwise rotation, viewed from the motor shaft, results in these waveforms.

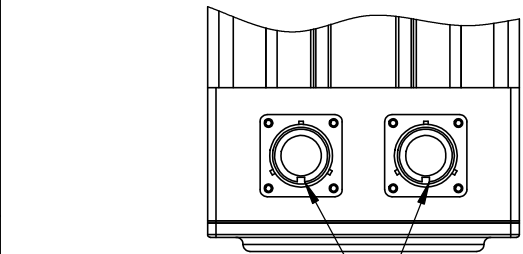


ENCODER CONN WIRING CODE	
FROM	TO PIN
OUTPUT A	A
OUTPUT A'	B
OUTPUT B	C
OUTPUT B'	D
OUTPUT Z	E
OUTPUT Z'	F
CASE GROUND	G
N/A	H
+ 5 VDC	J
+ 5 VDC	K
COMMON	L
COMMON	M
N/A	N
N/A	P
THERMOSTAT	R
THERMOSTAT	S
OUTPUT W (H1)	T
OUTPUT U (H3)	U
OUTPUT V (H2)	V

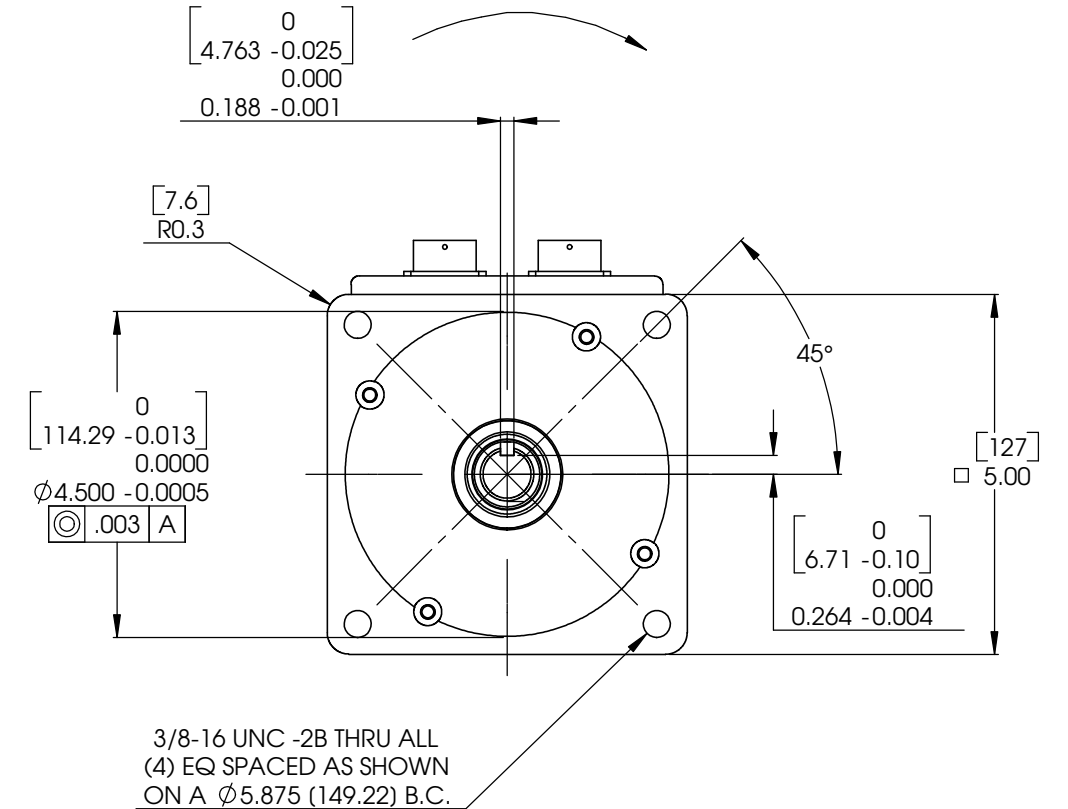
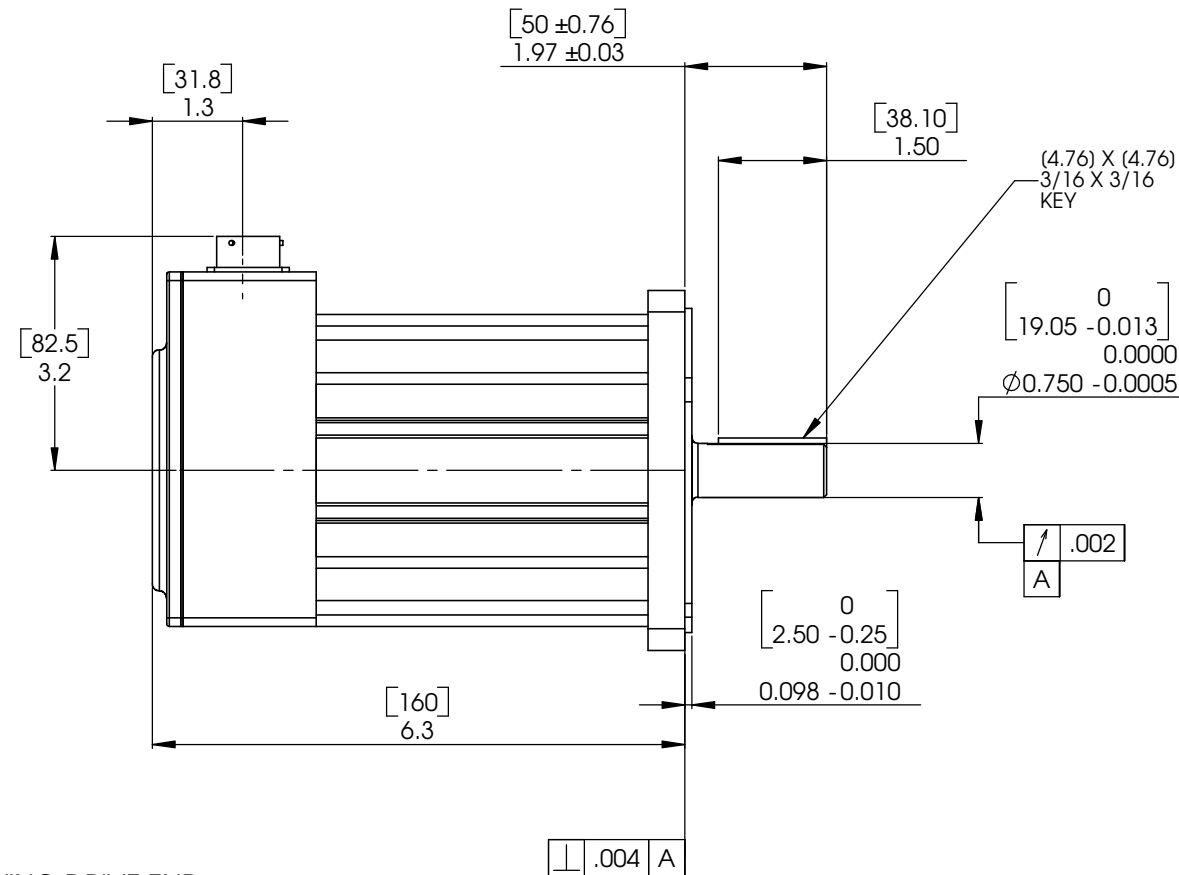
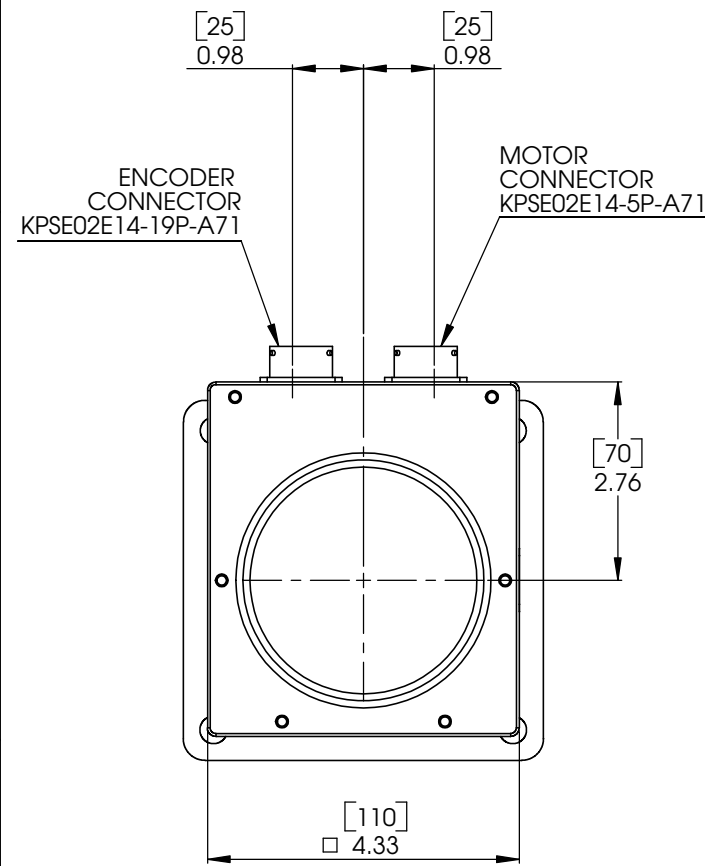
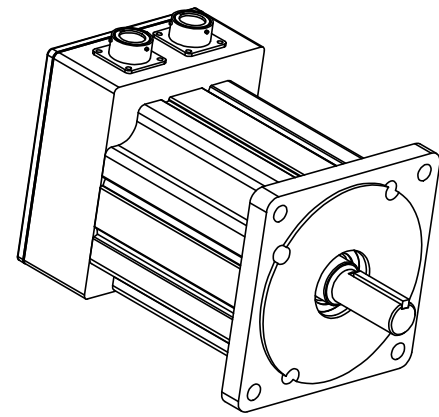
MOTOR CONN. WIRING CODE	
FROM	TO PIN
MOTOR M1	A
MOTOR M2	B
MOTOR M3	C
CASE	D

NOTE:  
TEMPERATURE SENSOR CONTACTS: NORMALLY CLOSED  
MAX AMPS: 6 AMP  
RATED VOLTAGE: 24VDC

**B** USE MOTOR CONFIGURATION FILE FROM CMC PER MOTOR MODEL NUMBER



POLARIZATION KEY TOWARDS REAR SIDE OF MOTOR



3/8-16 UNC -2B THRU ALL  
(4) EQ SPACED AS SHOWN  
ON A Ø5.875 (149.22) B.C.

NOTES:

1. ROTATION: CLOCKWISE MOTOR ROTATION VIEWING DRIVE END OCCURS WHEN PHASE A LEADS PHASE B, PHASE B LEADS PHASE C.
2. THE INDEX PULSE OCCURS WHEN FACING THE MOTOR, THE SHAFT KEYWAY IS ORIENTED 90° ± 10° CLOCKWISE (MECHANICAL) FROM CONNECTORS.

**B** FRAME: T1101 WITH NEMA 56 FLANGE

DIMENSIONS IN BRACKETS (DUAL) ARE IN MILLIMETERS

NOTICE		MILLIMETERS (mm) TOLERANCES UNLESS OTHERWISE SPECIFIED		APPLICATION	
Information contained herein is the sole property of Cleveland Motion Controls, Torque Systems Division. This may not be reproduced, copied or traced in any manner in part or whole without the written permission of Cleveland Motion Controls, Torque Systems Division.		X	+/- 0.25	NEXT ASY	USED ON
THIRD ANGLE PROJECTION		XX	+/- 0.125	110mm	
Tolerances in millimeters (mm) that apply unless otherwise specified. Interpret per and tol. per ASME Y14.5M-1994.		XXX	+/- 0.030		
DRAWN: MEZHER 1/29/07		ANGLES	+/- 0.30	CHECKED	
APPROVED		MATERIAL	N/A	APPROVED	
SCALE: 1:1		FINISH	N/A		

CAD GENERATED DRAWING. DO NOT MANUALLY UPDATE.

**CMC** Cleveland Motion Controls  
An Ingersoll Rand Company Torque Systems Division

OUTLINE N-5630  
ELECTROCRRAFT REPLACEMENT

REV. D DWG. NO. 32030-050

CAD FILE: 32030-050.SLDRAW

ENTER DRIVE LETTER BELOW( S for Sine, T for Trap)

S

ENTER UNIT LETTER BELOW( M for SI, E for English)

m

SELECT WINDING FROM DROP DOWN LIST

Ke = D3(Ke = 47 Vpk/krpm)

CHECKED:		SD		
all values at 25 deg c unless stated otherwise				
<b>TORQUE &amp; CURRENT AT 40 Deg C AMBIENT</b>				
^SPECIFICATIONS				
Symbol	Units	NOM	MIN	MAX
Tpk Torque,peak stall	Nm			12.0
Tc Torque,continuous stall	Nm	4.98	4.48	5.48
Ktp Torque sensitivity ( L TO L )	Nm/Apeak	0.389	0.350	0.428
Kt Torque sensitivity ( L TO L )	Nm/Arms	0.550	0.495	0.605
Ra Armature resistance ( L TO L )	ohms	.87	0.74	1.00
La Armature inductance ( L TO L )	millihenry	4.4	3.08	5.72
Ip Amps at Tpk	Apeak	30.8	27.7	33.9
Isp Amps at Tc stall	Apeak	15.08	13.57	16.59
Is Amps at Tc stall	Arms	10.66	9.59	11.73
Ke <sub>p</sub> Back EMF constant	Vpeak/Krpm	<b>47.00</b>	42.30	51.70
Ke <sub>r</sub> Back EMF constant	Vrms/Krpm	<b>33.24</b>	29.92	36.56
Ke <sub>l</sub> Back EMF constant	Vpeak/rad/sec	0.449	0.350	0.428
Ke <sub>l</sub> Back EMF constant	Vrms/rad/sec	0.318	0.286	0.350
Ep Volts @ Tpk	Vpeak	26.80		
Fi Viscous friction	Nm/Krpm	0.031		
Tf Static friction torque	Nm	0.034		
Ec volts @ Tc	Vpeak	19.679		
Jm Moment of inertia	Kg-cm <sup>2</sup>	2.37288		
Tm Time constant,mech	milliseconds	1.02		
Te Time constant,elect	milliseconds	5.06		
Rth Thermal resistance	deg C/watt	0.51		
Tth Time constant,thermal	minutes	25		
Oa Max armature temp	deg C			155
Km Figure of Merit	Nm/(amp-ohm)	0.417		
Nls Max operating speed	rpmmax			6000
# of motor poles		8		
Wt weight	Kg	4.9		

MODE/NUMBER

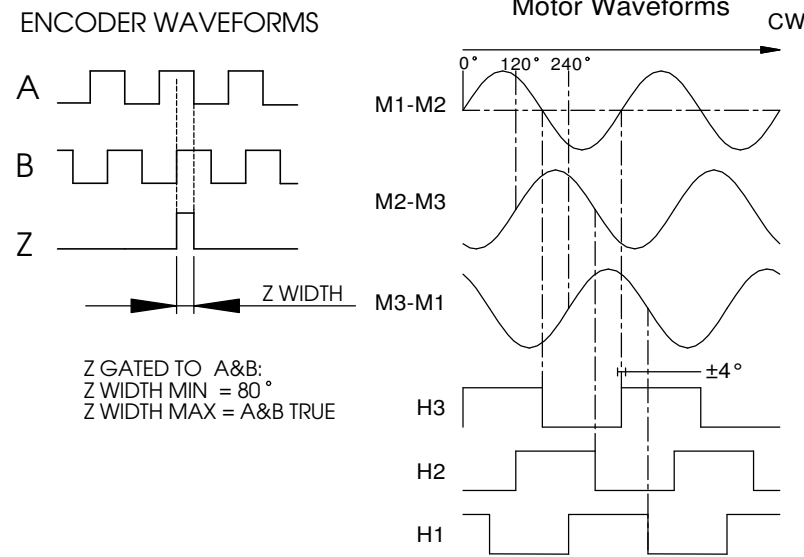
T1101 D3(Ke = 47 Vpk/krpm)		DRAWN:	AR
STD	CUST	APPROVED:	
YES		SD	
<b>T1101</b>			
MOTOR IS MOUNTED ON A 304.8 mmx304.8 mmx12.7 mm ALUMINUM PLATE IN A 40 DEG.C AMBIENT			
SPEED/ TORQUE CURVE SHOWN IS RATED. TYPICAL VALUES ARE WITH IN +/- 10% OF RATING			
<b>OTHER SPECIFICATIONS</b>			
<b>SINUSOIDAL DRIVE</b>		REV(Dt)	Description
		A(11/11/05)	Initial Release
		B(2/10/06)	Add RMS Kt and Ke
		C(3/20/06)	Add # of poles
		D(4/6/06)	Sine SI Ke values corrected
		E(2/20/07)	Add C6 and D3 winding
		F(5/07/07)	Reconfigured speed/torque

RPM	Trated Nm	Peak Voltage	Peak Current	RMS Current	Watts
0	4.981	19.7	15.08	10.66	222
300	4.957	33.7	15.00	10.61	404
600	4.926	47.7	14.91	10.54	581
1200	4.845	75.5	14.66	10.37	927
1800	4.736	103.3	14.33	10.13	1250
2400	4.598	131.0	13.92	9.84	1549
3000	4.430	158.5	13.41	9.48	1813
3600	4.226	185.9	12.79	9.04	2033
4200	3.984	213.1	12.06	8.53	2205
4800	3.696	240.2	11.19	7.91	2308
5400	3.351	267.0	10.14	7.17	2329
6000	2.933	293.6	8.88	6.28	2246

Rated Speed	Rated Torque
5400	3.4
Rated watts 1898	

REVISIONS				
REV	ECN	DESCRIPTION	DATE	APP'D
A	DR8384	RELEASED	1/29/07	T.M.
B	ECN3230	LABEL REMOVED FROM DRG, NOTES ADDED	07/03/07	J.S.

Clockwise rotation, viewed from the motor shaft, results in these waveforms.

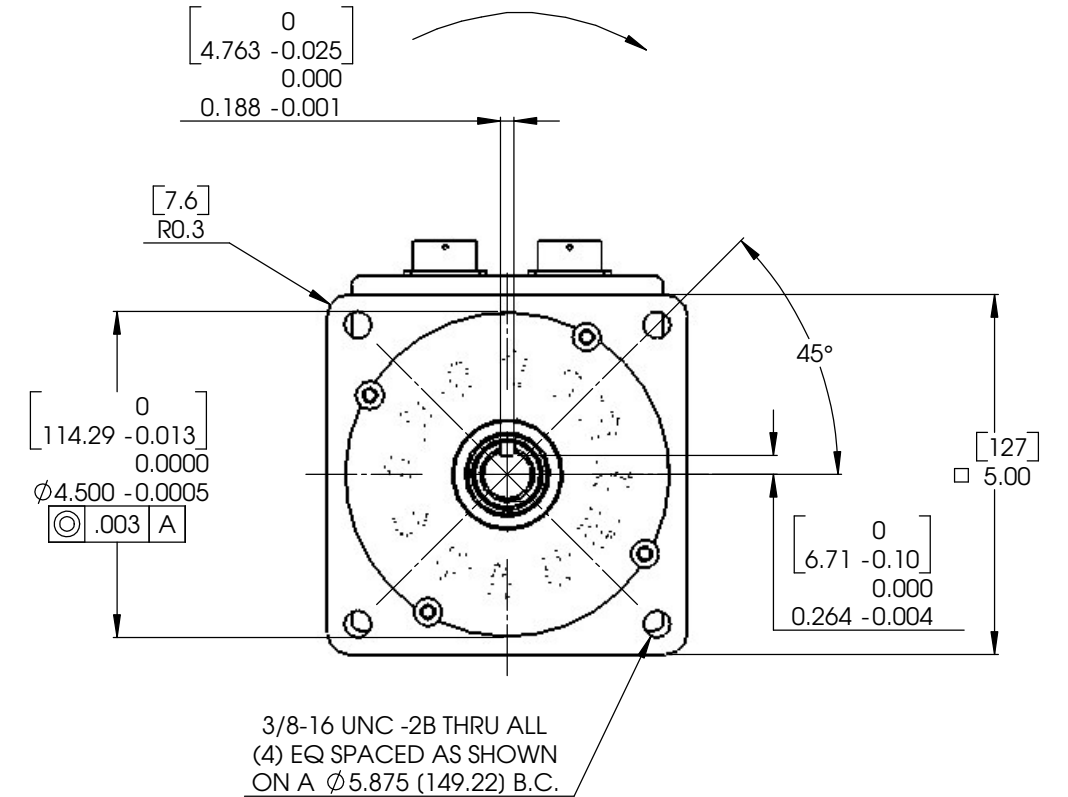
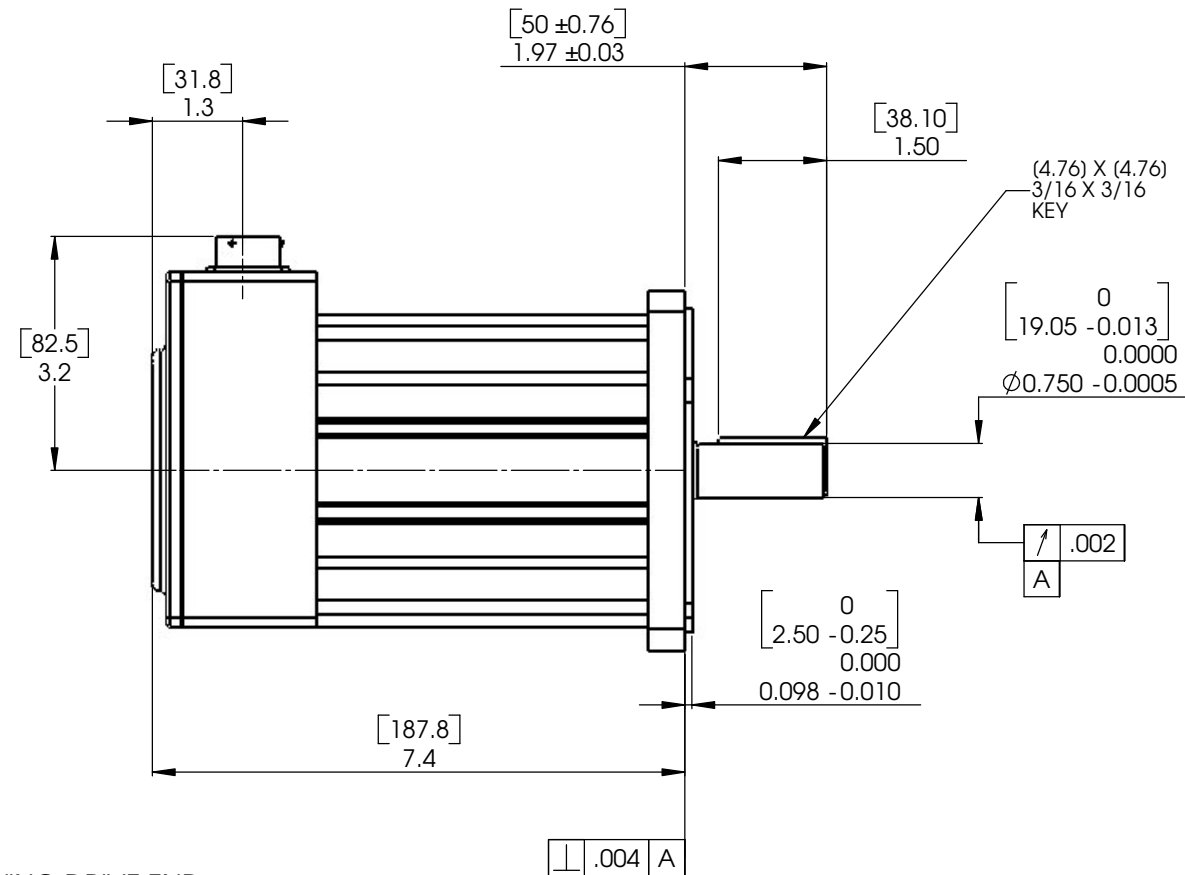
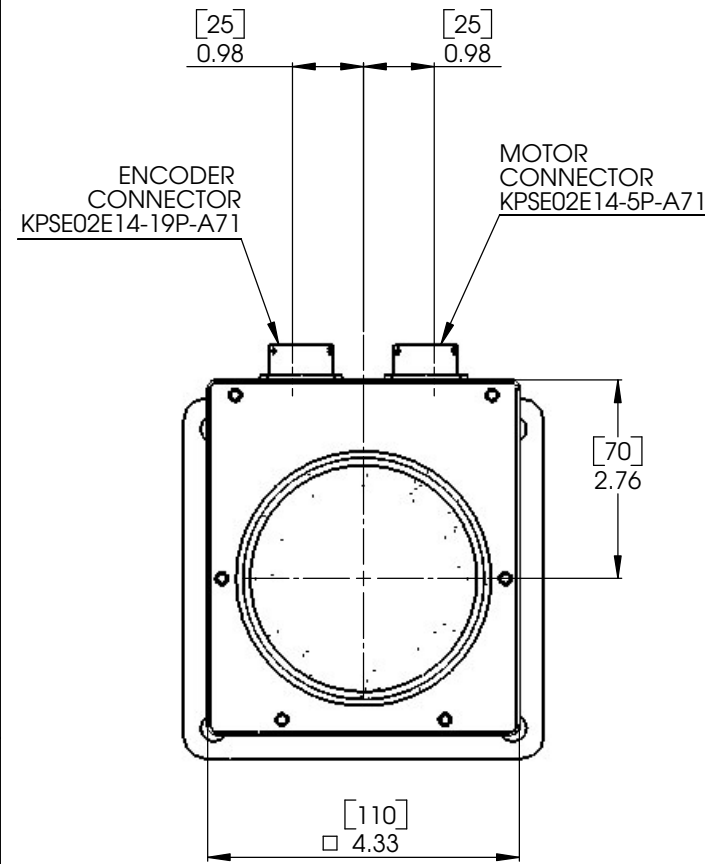
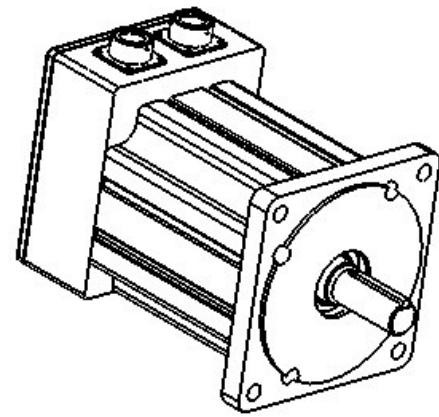
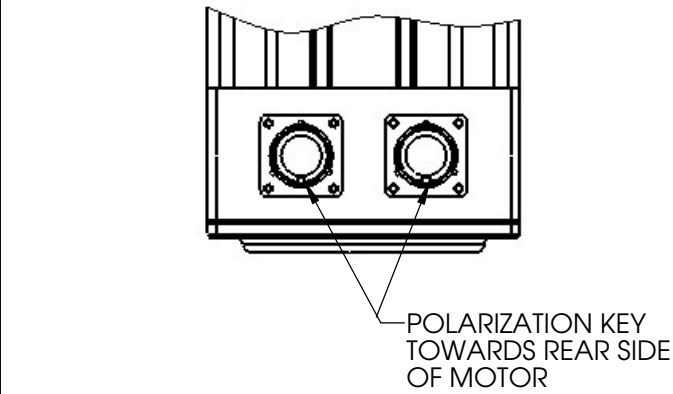


ENCODER CONN WIRING CODE	
FROM	TO PIN
OUTPUT A	A
OUTPUT A'	B
OUTPUT B	C
OUTPUT B'	D
OUTPUT Z	E
OUTPUT Z'	F
CASE GROUND	G
N/A	H
+ 5 VDC	J
+ 5 VDC	K
COMMON	L
COMMON	M
N/A	N
N/A	P
THERMOSTAT	R
THERMOSTAT	S
OUTPUT W (H1)	T
OUTPUT U (H3)	U
OUTPUT V (H2)	V

MOTOR CONN. WIRING CODE	
FROM	TO PIN
MOTOR M1	A
MOTOR M2	B
MOTOR M3	C
CASE	D

NOTE:  
TEMPERATURE SENSOR CONTACTS: NORMALLY CLOSED  
MAX AMPS: 6 AMP  
RATED VOLTAGE: 24VDC

**B** USE MOTOR CONFIGURATION FILE FROM CMC PER MOTOR MODEL NUMBER



NOTES:

1. ROTATION: CLOCKWISE MOTOR ROTATION VIEWING DRIVE END OCCURS WHEN PHASE A LEADS PHASE B, PHASE B LEADS PHASE C.
2. THE INDEX PULSE OCCURS WHEN FACING THE MOTOR, THE SHAFT KEYWAY IS ORIENTED 90° ± 10° CLOCKWISE (MECHANICAL) FROM CONNECTORS.

**B** FRAME: T1102 with nema 56 flange

DIMENSIONS IN BRACKETS (DUAL) ARE IN MILLIMETERS

NOTICE		MILLIMETERS (mm) TOLERANCES UNLESS OTHERWISE SPECIFIED		APPLICATION	
Information contained herein is the sole property of Cleveland Motion Controls, Torque Systems Division. This may not be reproduced, copied or traced in any manner in part or whole without the written permission of Cleveland Motion Controls, Torque Systems Division.		X	+/- 0.25	NEXT ASY	USED ON
THIRD ANGLE PROJECTION		XX	+/- 0.25		110mm
Tolerances in millimeters from that shown are acceptable. Interpret per ASME Y14.5M-1994.		XXX	+/- 0.100	CHECKED	DATE: 1/29/07
DRAWN: MEZHER		APPROVED:		TITLE: OUTLINE N-5637, N-5647 ELECTROCRRAFT REPLACEMENT	
MATERIAL: N/A		FINISH: N/A		REV:	B
SCALE: 1:1		DWG. NO.: 32030-052		SHEET 1 OF 1	

CAD GENERATED DRAWING. DO NOT MANUALLY UPDATE.

CAD FILE: 32030-052.SUDRW

ENTER DRIVE LETTER BELOW ( S for Sine, T for Trap)

ENTER BUS VOLT BELOW(Vdc)

s

325

ENTER UNIT LETTER BELOW ( M for SI, E for English)

m

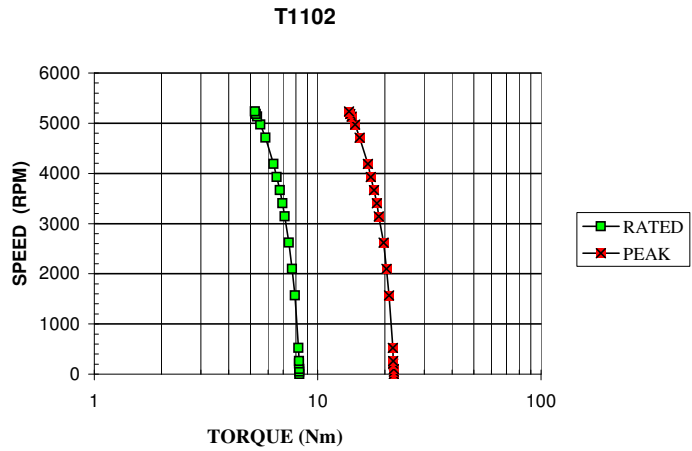
SELECT WINDING FROM DROP DOWN LIST

Ke = E0(Ke = 60 Vpk/krpm)

CHECKED:		SD			
all values at 25 deg c unless stated otherwise					
<b>TORQUE &amp; CURRENT AT 40 Deg C AMBIENT</b>					
^SPECIFICATIONS					
Symbol	Units	NOM	MIN	MAX	
Tpk Torque,peak stall	Nm			21.9	
Tc Torque,continuous stall	Nm	8.29	7.46	9.12	
Ktp Torque sensitivity ( L TO L )	Nm/Apeak	0.496	0.446	0.546	
Kl Torque sensitivity ( L TO L )	Nm/Arms	0.702	0.632	0.772	
Ra Armature resistance ( L TO L )	ohms	0.58	0.49	0.67	
La Armature inductance ( L TO L )	millihenry	3.6	2.52	4.68	
lp Amps at Tpk	Apeak	44.2	39.8	48.6	
lsp Amps at Tc stall	Apeak	19.66	17.69	21.63	
ls Amps at Tc stall	Arms	13.90	12.51	15.29	
Ke <sub>p</sub> Back EMF constant	Vpeak/Krpm	60.00	54.00	66.00	
Ke Back EMF constant	Vrms/Krpm	42.43	38.19	46.67	
Ke <sub>p</sub> Back EMF constant	Vpeak/rad/sec	0.573	0.446	0.546	
Ke Back EMF constant	Vrms/rad/sec	0.405	0.365	0.446	
Ep Volts @ Tpk	Vpeak	25.64			
Fi Viscous friction	Nm/Krpm	0.350			
Tf Static friction torque	Nm	0.500			
Ec volts @ Tc	Vpeak	17.104			
Jm Moment of inertia	Kg-cm <sup>2</sup>	4.29379			
Tm Time constant,mech	milliseconds	0.76			
Te Time constant,elect	milliseconds	6.21			
Rth Thermal resistance	deg C/watt	0.45			
Tth Time constant,thermal	minutes	28			
Oa Max armature temp	deg C			155	
Km Figure of Merit	Nm/(amp-ohm)	0.65			
Nls Max operating speed	rpmmax			5237	
# of motor poles		8			
Wt weight	Kg	6.7			

MODE NUMBER

T1102	E0(Ke = 60 Vpk/krpm)	DRAWN:	AR
	STD	CUST	APPROVED:
	YES		SD



RPM	Rated Nm	Peak Voltage	Peak Current	RMS Current	Watts
0	8.290	17.1	19.66	13.90	252
262	8.249	32.7	19.56	13.83	516
524	8.199	48.4	19.44	13.75	776
1047	8.071	79.5	19.14	13.53	1280
1571	7.902	110.6	18.74	13.25	1759
2095	7.691	141.6	18.24	12.90	2203
2619	7.434	172.5	17.63	12.47	2603
3142	7.128	203.2	16.90	11.95	2945
3666	6.766	233.9	16.04	11.34	3223
4190	6.338	264.5	15.03	10.63	3420
4713	5.834	294.8	13.83	9.78	3512
5237	5.231	325.0	12.40	8.77	3475

Rated Speed	Rated Torque
4713	5.8
Rated watts	2884

OTHER SPECIFICATIONS	
<b>SINUSOIDAL DRIVE</b>	
REV(Dt)	Description
A(11/11/05)	Initial Release
B(2/10/06)	Add RMS Kt and Ke
C(3/20/06)	Add # of poles
D(4/6/06)	Sine SI Ke values corrected
E(2/20/07)	Add G3 winding
F(5/07/07)	Reconfigured speed/torque

MOTOR IS MOUNTED ON A 304.8 mmx304.8 mmx12.7 mm ALUMINUM PLATE IN A 40 DEG.C AMBIENT  
 SPEED/ TORQUE CURVE SHOWN IS RATED. TYPICAL VALUES ARE WITH IN +/- 10% OF RATING

ENTER DRIVE LETTER BELOW ( S for Sine, T for Trap)

ENTER BUS VOLT BELOW(Vdc)

s

325

ENTER UNIT LETTER BELOW ( M for SI, E for English)

m

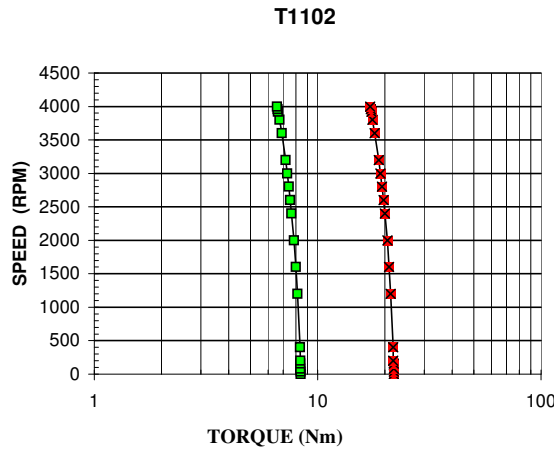
SELECT WINDING FROM DROP DOWN LIST

Ke = G3(Ke = 77 Vpk/krpm)

MODE NUMBER

CHECKED:	SD	T1102	G3(Ke = 77 Vpk/krpm)	DRAWN:	AR
all values at 25 deg c unless stated otherwise		STD	CUST	APPROVED:	
<b>TORQUE &amp; CURRENT AT 40 Deg C AMBIENT</b>		YES		SD	

Symbol		Units	NOM	MIN	MAX
Tpk	Torque,peak stall	Nm			21.9
Tc	Torque,continuous stall	Nm	8.39	7.55	9.23
Ktp	Torque sensitivity ( L TO L )	Nm/Apeak	0.637	0.573	0.701
Kt	Torque sensitivity ( L TO L )	Nm/Arms	0.900	0.810	0.990
Ra	Armature resistance ( L TO L )	ohms	.932	0.79	1.07
La	Armature inductance ( L TO L )	millihenry	5.9	4.13	7.67
Ip	Amps at Tpk	Apeak	34.4	31.0	37.8
Isp	Amps at Tc stall	Apeak	15.51	13.96	17.06
Is	Amps at Tc stall	Arms	10.97	9.87	12.07
Kep	Back EMF constant	Vpeak/Krpm	77.00	69.30	84.70
Ke	Back EMF constant	Vrms/Krpm	54.46	49.01	59.91
Ke	Back EMF constant	Vpeak/rad/sec	0.735	0.573	0.701
Ke	Back EMF constant	Vrms/rad/sec	0.520	0.468	0.572
Ep	Volts @ Tpk	Vpeak	32.06		
Fi	Viscous friction	Nm/Krpm	0.350		
Tf	Static friction torque	Nm	0.500		
Ec	volts @ Tc	Vpeak	21.683		
Jm	Moment of inertia	Kg-cm2	4.29379		
Tm	Time constant,mech	milliseconds	0.74		
Te	Time constant,elect	milliseconds	6.33		
Rth	Thermal resistance	deg C/watt	0.45		
Tth	Time constant,thermal	minutes	28		
Oa	Max armature temp	deg C		155	
Km	Figure of Merit	Nm/(amp-ohm)	0.66		
Nls	Max operating speed	rpmmax			4000
	# of motor poles		8		
Wt	weight	Kg	6.7		



RPM	Rated Nm	Peak Voltage	Peak Current	RMS Current	Watts
0	8.393	21.7	15.51	10.97	252
200	8.363	37.0	15.45	10.92	456
400	8.327	52.3	15.39	10.88	659
800	8.238	82.9	15.22	10.76	1055
1200	8.126	113.4	15.01	10.61	1437
1600	7.991	143.8	14.76	10.44	1804
2000	7.830	174.2	14.47	10.23	2149
2400	7.642	204.5	14.12	9.98	2468
2800	7.427	234.8	13.72	9.70	2759
3200	7.181	265.0	13.27	9.38	3015
3600	6.901	295.0	12.75	9.02	3233
4000	6.585	325.0	12.17	8.61	3403

Rated Speed	Rated Torque
4000	6.6
Rated watts 2763	

MOTOR IS MOUNTED ON A 304.8 mmx304.8 mmx12.7 mm ALUMINUM PLATE IN A 40 DEG.C AMBIENT

SPEED/ TORQUE CURVE SHOWN IS RATED. TYPICAL VALUES ARE WITH IN +/- 10% OF RATING

OTHER SPECIFICATIONS	
REV(Dt)	Description
A(11/11/05)	Initial Release
B(2/10/06)	Add RMS Kt and Ke
C(3/20/06)	Add # of poles
D(4/6/06)	Sine SI Ke values corrected
E(2/20/07)	Add G3 winding
F(5/07/07)	Reconfigured speed/torque

**SINUSOIDAL DRIVE**