

NOTES:

1. MATERIALS:

SHAFT(S): 17-4 PH STAINLESS STEEL (Rc 42-47).  
 HOUSING(S)/ENDBELL(S): 303 STAINLESS STEEL.  
 BEARINGS: STAINLESS STEEL (DOUBLE SHIELDED, ABEC 3).  
 INTERNAL GEARHEAD COMPONENTS: 17-4 PH STAINLESS STEEL/CARBIDE  
 RETAINING RING: PH 15-7 MO

2. LUBRICANT:

BEARINGS: THIXOGREASE.

3. MOLDING/COATING MATERIALS:

STATOR/PC BOARD/LEAD EXIT: THERMOSET EPOXY

4. DIELECTRIC TEST:

500 VOLTS AC (RMS), .1 mA MAX RESISTANCE LEAKAGE CURRENT, ALL LEADS TO CASE.

5. ETCH PART NUMBER, UNIQUE SERIAL NUMBER, BAR CODE, AND DATE CODE IN AREA SHOWN. CHARACTER SIZE TO BE APPROX. .10[2.5mm] HIGH X .05[1.3mm] WIDE.

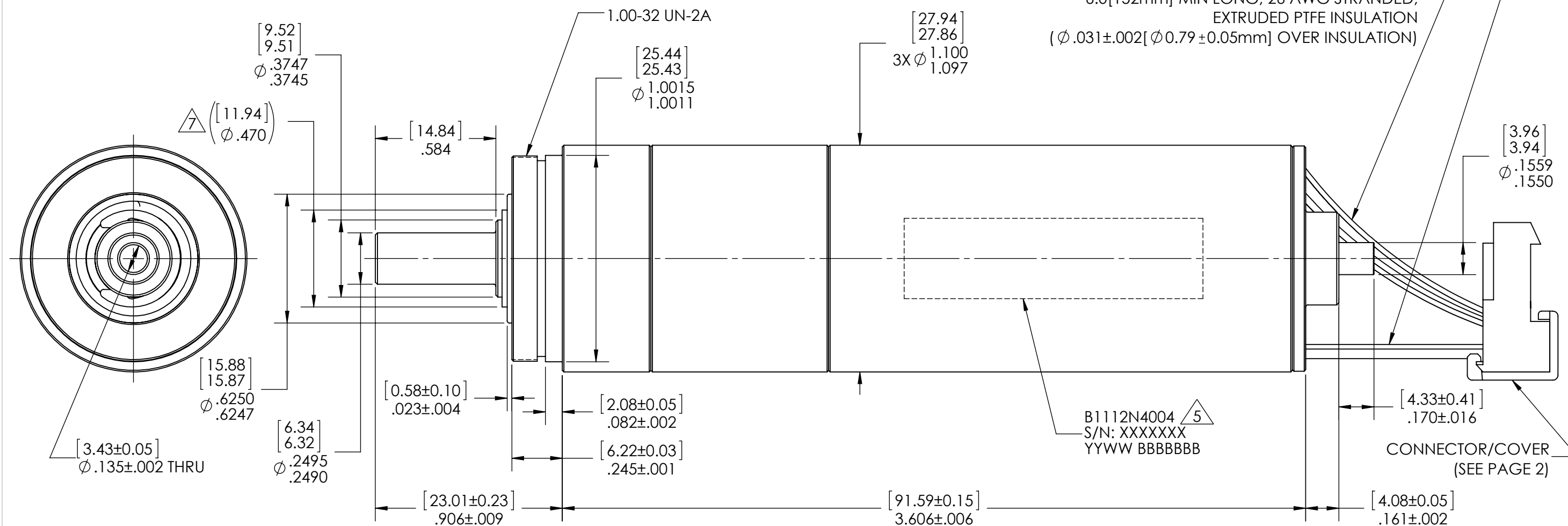
6. PRODUCT SUITABLE FOR AUTOCLAVING (NON-OPERATING) WHEN PROPERLY SEALED IN USE.

7. OD OF RETAINING RING (CLEARANCE DIAMETER).

8. RoHS (DIRECTIVE 2011/65/EU AND AMENDMENTS) COMPLIANT.

MOTOR LEADS:  
 6.0[152mm] MIN LONG, 18 AWG STRANDED,  
 EXTRUDED PTFE INSULATION  
 (  $\phi$  .069 $\pm$ .005[  $\phi$  1.75 $\pm$ 0.13mm] OVER INSULATION)

HALL SENSOR LEADS:  
 6.0[152mm] MIN LONG, 26 AWG STRANDED,  
 EXTRUDED PTFE INSULATION  
 (  $\phi$  .031 $\pm$ .002[  $\phi$  0.79 $\pm$ 0.05mm] OVER INSULATION)



CHG.	REVISION	DATE	APPR
F	ECO#21620	07/16	WAA
E	ECO#21529	03/16	WAA
D	ECO#21442	12/15	WAA
C/A	ECO#21410	10/15	WAA
CHG.	REVISION	DATE	APPR

TOLERANCES UNLESS SPECIFIED
DECIMAL .XXX $\pm$ .005
DECIMAL .XX $\pm$ .010
DECIMAL .X $\pm$ .030
ANGLES $\pm$ 0.5°
SURFACE FINISH $\sqrt{63}$
METRIC DIM. APPROX.
DRAWN D. L. HUNTER
APPROV J. GEWIRTZ
CAGE CODE
<b>06989</b>

**Portescap**  
 WEST CHESTER, PA. 19382

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**OUTLINE DRAWING**

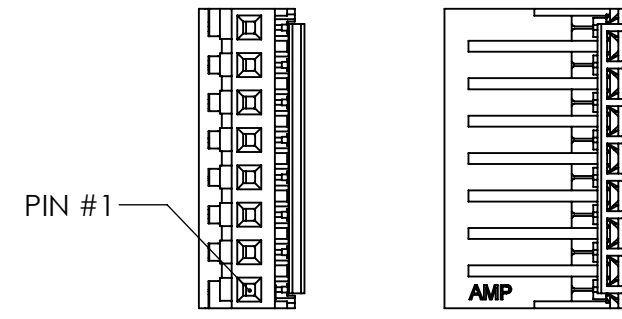
**4 POLE BRUSHLESS DC MOTOR  
 W/DUAL STAGE PLANETARY GEARHEAD**

SCALE 2:1	DWG. NO. B1112N4004	REV. F
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SYMBOL	PARAMETER	UNITS	VALUE MOTOR ONLY	VALUE w/16:1 GEARHEAD
Tcs	Continuous Stall Torque (1)	oz-in	10.09	130.8
		mNm	71.2	923.4
Tpk	Peak Torque (1)	oz-in	154.7	2005.2
		mNm	1092.6	14160
Ics	Continuous Stall Current (1)	Amps DC	9.29	9.29
Ipk	Peak Current (1)	Amps DC	122.1	122.1
Km	Motor Constant (1)	oz-in/watt <sup>0.5</sup>	3.70	48.0
		mNm/watt <sup>0.5</sup>	26.16	339.0
Kt cold	Torque Constant (6-step DC drive) at 25°C	oz-in/Amp DC	1.27	16.4
		mNm/amp DC	8.95	116.0
Kt hot	Torque Constant (6-step DC drive) at 155°C winding temp (1)	oz-in/Amp DC	1.09	14.1
		mNm/amp DC	7.67	99.4
Ke	Voltage Constant (6-step DC drive) at 25°C	v/krpm	0.937	14.99
L	Inductance - Φ to Φ	mH±20%	0.061	0.061
R	Resistance - Φ to Φ at 25°C	Ohms	0.117	0.117
J	Inertia	oz-in-sec <sup>2</sup> x 10 <sup>-6</sup>	120	-----
		kg-cm <sup>2</sup> x 10 <sup>-4</sup>	84.74	-----
Rth	Thermal Resistance (1)	°C/watt	8.30	8.30
Wnl	No Load Speed at 14.4 volts-25°C	rpm	15319	957.0
Inl	No Load Current at 14.4 volts-25°C	mA ±50%	800.0	900.0
Tm	Mechanical Time Constant	msec	1.85	-----
Tf	Static Friction	oz-in±20%	0.500	-----
		mNm	3.53	-----
	Max Axial Force (2)	lb	1.98	12.44
		N	8.81	55.34
	Max Radial Force (2) (3)	lb	43.65	22.77
		N	194.17	101.31
	Gearhead Efficiency per stage	% (MIN)	81	81
M	Weight	oz	7.88	12.4
		gm	223	350

Tolerances on all values ±10% unless otherwise specified.

- Motor thermal ratings are determined with a max. winding temperature of 155°C in a 25°C ambient. Values reflect continuous operating conditions as applicable with the motor or motor-gearhead mounted to a 5.0 [127mm] X 5.0 [127mm] X 0.25 [6.35mm] aluminum heat sink. The rms torque equivalent when operating in the peak (intermittent) region must be within the continuous operating region of the motor/motor-gearhead.
- Values are for static force application only. For dynamic conditions, consult factory.
- Radial force applied .197 [5mm] from outer most face of motor and .236 [6mm] from gearhead bearing.

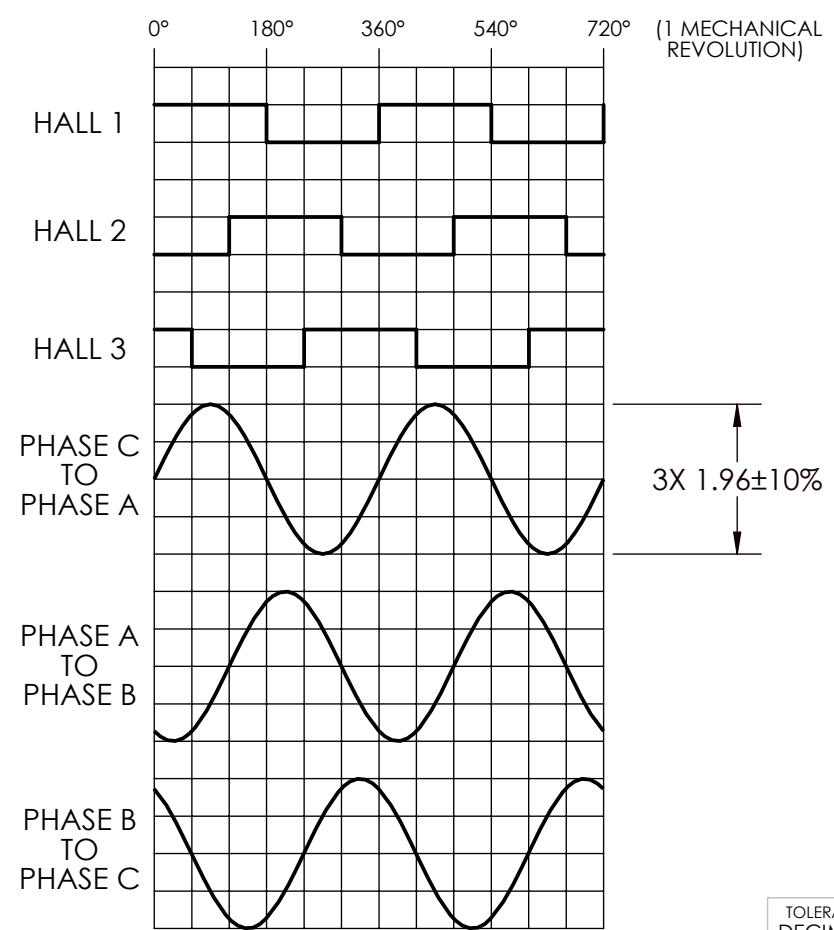


CONNECTOR:  
AMP PART NUMBER 3-640430-8 WITH COVER 643067-8 OR EQUIVALENTS

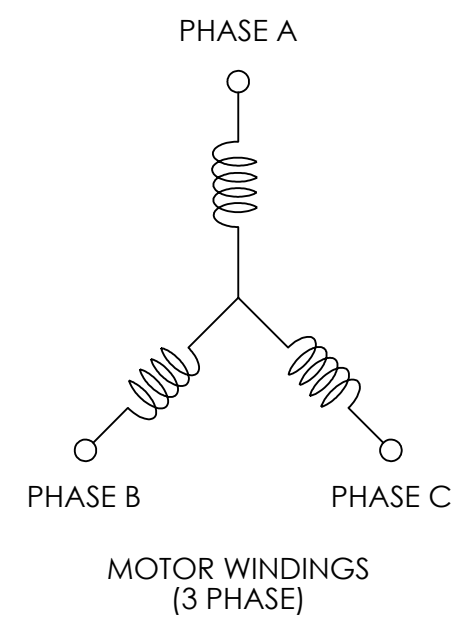
SUGGESTED MATING CONNECTOR:  
AMP MTA-156 SERIES (NOT SUPPLIED)

CONNECTOR WIRING		
PIN #	LEAD COLOR	FUNCTION
1	BLUE	PHASE A
2	BROWN	PHASE B
3	VIOLET	PHASE C
4	RED	4.5 TO 24 VDC
5	YELLOW	HALL 1
6	ORANGE	HALL 2
7	WHITE	HALL 3
8	BLACK	SUPPLY RTN

**TIMING DIAGRAM**  
MOTOR TO HALL  
PHASE SEQUENCING



WHEN MOTOR DRIVEN CW (WHEN VIEWED FROM SHAFT END) AT 1000 RPM, THESE WAVEFORMS RESULT.



TOLERANCES UNLESS SPECIFIED	
DECIMAL .XXX	±.005
DECIMAL .XX	±.010
DECIMAL .X	±.030
ANGLES	±0°30'
SURFACE FINISH	63

METRIC DIM. APPROX.

DRAWN	D. L. HUNTER
APPROV	J. GEWIRTZ
CAGE CODE	<b>06989</b>

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**PERFORMANCE SPECIFICATIONS**

**4 POLE BRUSHLESS DC MOTOR  
W/DUAL STAGE PLANETARY GEARHEAD**

SCALE 5:4	DWG. NO. B1112N4004	REV. F
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