

MF-2806.5-1400

BRUSHLESS DC MOTOR - ENGINEERING SPECIFICATION

Model-F Gauntlet Attack Drone Propulsion System

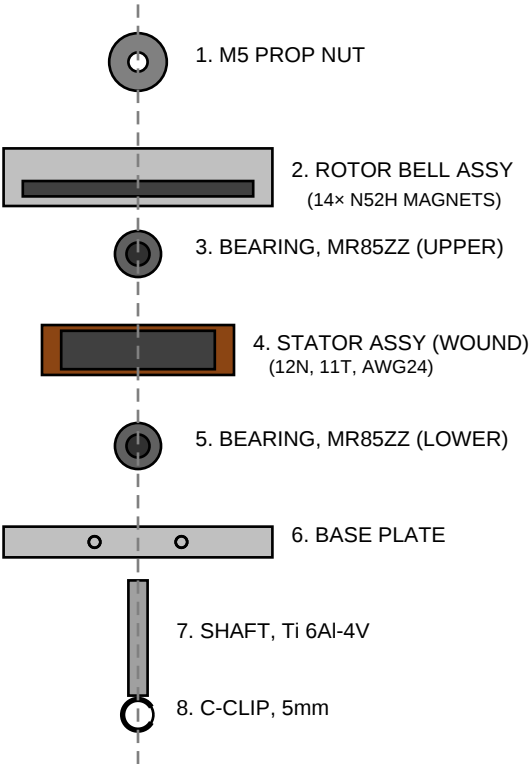
PARAMETER	VALUE	UNIT
Stator Size	2806.5 (28mm × 6.5mm)	-
KV Rating	1400 ± 50	RPM/V
Configuration	12N14P	-
Termination	Delta (Δ)	-
Max Continuous Current	45	A
Max Continuous Power	1000	W
Voltage Range	14.8 - 25.2 (4S-6S)	V
Phase Resistance	0.065 ± 0.010	Ω
No-Load Current (10V)	0.8	A
Motor Weight	< 45 (< 1.59)	g (oz)
Shaft Diameter	0.1969 (5.0)	in (mm)
Mounting Pattern	0.6299 / 0.7480 (16/19)	in (mm)
Bearing Type	MR85ZZ (2×)	-
Magnet Grade	N52H NdFeB	-
Max Operating Temp	180	°C
Prop Size Range	6 - 8	inch

DESIGN NOTES:

1. All dimensions in inches unless otherwise specified. Metric equivalents in parentheses.
2. Tolerances per ASME Y14.5-2018: .XX = ±0.01, .XXX = ±0.005, .XXXX = ±0.0005
3. Motor designed for Roma F7 frame compatibility (16mm and 19mm mount patterns)
4. Stator laminations: M19 silicon steel, 0.0079" (0.2mm) thickness, insulated
5. Winding: AWG 24, Class H (180°C), 11 turns per tooth, Delta termination
6. All aluminum parts to be hard anodized Type III, 0.001-0.002" thickness
7. Dynamic balance required: < 0.1 g-mm residual unbalance

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MOTOR ASSEMBLY DWG: MF-2806-001	REV A	SHEET 1/8

MOTOR ASSEMBLY - EXPLODED VIEW



ITEM	PART NUMBER	DESCRIPTION	QTY	MATERIAL
1	MF-2806-NUT	Prop Nut, M5 Nyloc	1	Steel, Zinc
2	MF-2806-BELL	Rotor Bell Assembly	1	7075-T6 Al
2a	MF-2806-MAG	Arc Magnet, N52H	14	NdFeB
3	MR85ZZ	Bearing, 5x8x2.5mm	2	Chrome Steel
4	MF-2806-STAT	Stator Assembly, Wound	1	M19 Steel
5	MF-2806-WIRE	Magnet Wire, AWG24	AR	Copper, Class H
6	MF-2806-BASE	Base Plate	1	7075-T6 Al
7	MF-2806-SHFT	Shaft	1	Ti 6Al-4V
8	C-CLIP-5	C-Clip, 5mm	1	Spring Steel

MODEL-F PROPULSION

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MOTOR ASSEMBLY

DWG: MF-2806-001

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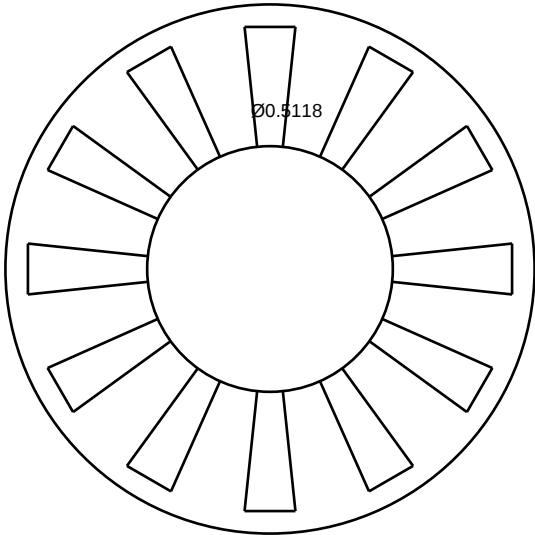
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STATOR LAMINATION - MF-2806-STAT-LAM

VIEW A - LAMINATION (SCALE 2.5:1)



VIEW B - SECTION (SCALE 2.5:1)



STATOR LAMINATION SPECIFICATIONS	
Material	M19 Silicon Steel (ASTM A677)
Thickness	0.0079 in (0.20 mm)
Stack Height	0.2559 in (6.5 mm)
Lamination Count	33
Outer Diameter	1.1024 in (28.0 mm)
Inner Diameter	0.5118 in (13.0 mm)
Poles (Teeth)	12
Tooth Width	0.1181 in (3.0 mm)
Slot Width	0.1378 in (3.5 mm)
Insulation	C-5 Coating, Both Sides
Stacking Factor	> 0.95

- NOTES:
- Laminations to be laser cut or stamped
 - Deburr all edges, 0.002 max break
 - Stack and bond with Loctite 380
 - Maintain perpendicularity 0.001 TIR
 - ID to be concentric to OD within 0.0005

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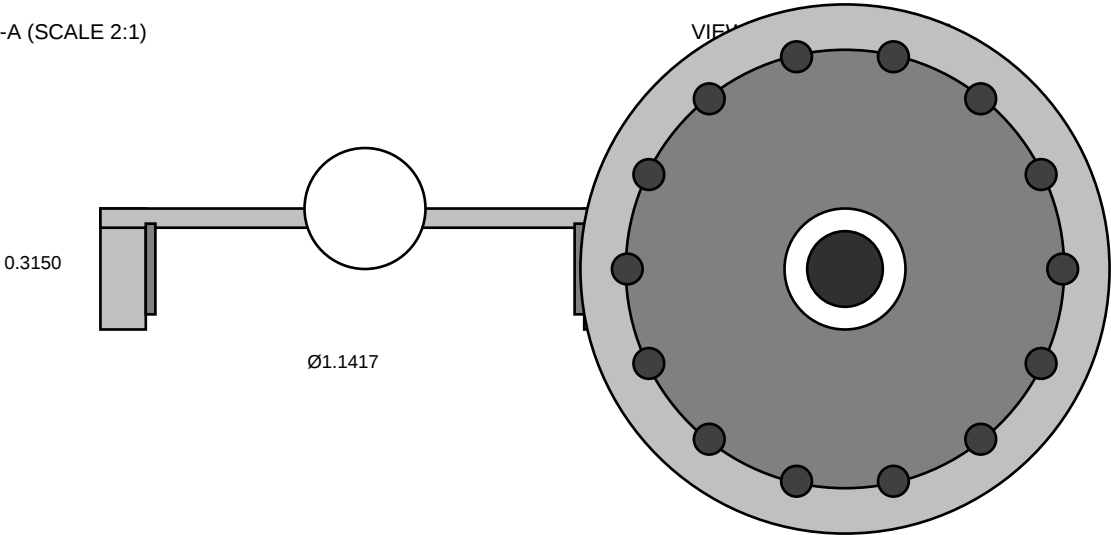
STATOR LAMINATION
DWG: MF-2806-STAT-LAM

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ROTOR BELL - MF-2806-BELL

SECTION A-A (SCALE 2:1)



ROTOR BELL SPECIFICATIONS	
Material	7075-T6 Aluminum
Outer Diameter	1.3780 in (35.0 mm)
Inner Diameter (Magnet Pocket)	1.1417 in (29.0 mm)
Height	0.3150 in (8.0 mm)
Wall Thickness (Rim)	0.0394 in (1.0 mm)
Bearing Pocket Dia	0.3150 +0.0002/-0.0000
Bearing Pocket Depth	0.1024 in (2.6 mm)
Magnet Count	14
Finish	Hard Anodize Type III, Black
Dynamic Balance	< 0.05 g-mm

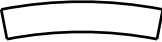
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ROTOR BELL
 DWG: MF-2806-BELL

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ARC MAGNET - MF-2806-MAG



MAGNET GEOMETRY (SCALE 4:1)

SIDE VIEW (SCALE 4:1)



MAGNET SPECIFICATIONS	
Material	NdFeB, Grade N52H
Arc Outer Radius	0.5512 in (14.0 mm)
Arc Inner Radius	0.5118 in (13.0 mm)
Radial Thickness	0.0394 in (1.0 mm)
Axial Height	0.2362 in (6.0 mm)
Arc Angle	22.0°
Quantity per Motor	14
Magnetization	Radial, Alternating Poles
Br (Remanence)	1.42 - 1.47 T
Hcj (Coercivity)	> 1990 kA/m
BHmax	48-51 MGOe
Max Operating Temp	120°C (248°F)
Coating	NiCuNi, 15-25 µm
Tolerance	±0.002 in on all dims

■ **CAUTION:**
N52H magnets are extremely strong.
Handle with care. Keep away from
electronics and pacemakers.

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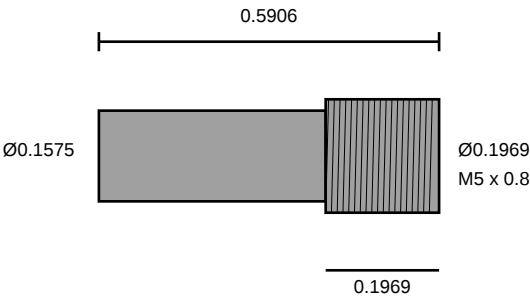
ARC MAGNET N52H
DWG: MF-2806-MAG

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MOTOR SHAFT - MF-2806-SHFT

SHAFT PROFILE (SCALE 3:1)



SHAFT SPECIFICATIONS	
Material	Titanium 6Al-4V (Grade 5)
Total Length	0.5906 in (15.0 mm)
Bearing Seat Diameter	0.1575 in (4.0 mm)
Thread Diameter	0.1969 in (5.0 mm)
Thread	M5 x 0.8, Class 6g
Thread Length	0.1969 in (5.0 mm)
Bearing Seat Length	0.3150 in (8.0 mm)
C-Clip Groove	0.1969 ID x 0.0197 deep
Surface Finish	16 µin Ra (bearing seat)
Hardness	36 HRC minimum
Runout	< 0.0005 TIR

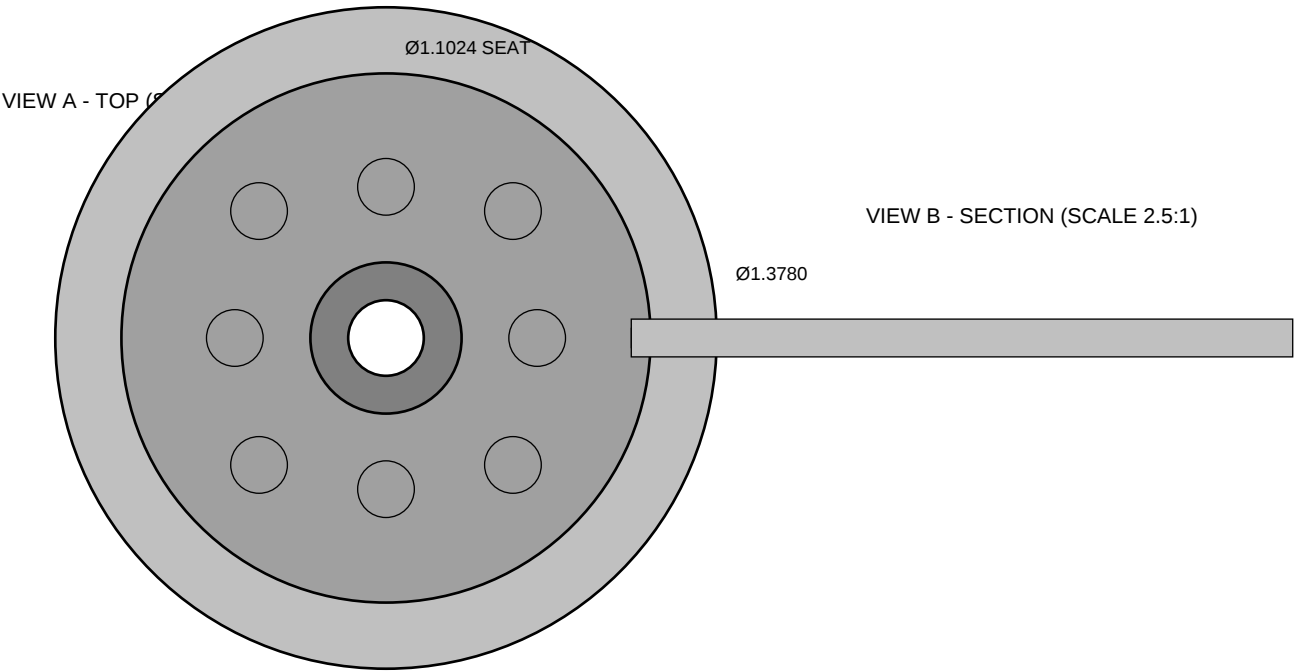
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MOTOR SHAFT
DWG: MF-2806-SHFT

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BASE PLATE - MF-2806-BASE

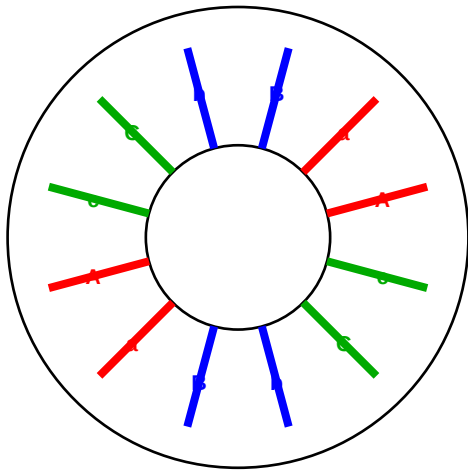


BASE PLATE SPECIFICATIONS	
Material	7075-T6 Aluminum
Outer Diameter	1.3780 in (35.0 mm)
Thickness	0.0787 in (2.0 mm)
Stator Seat Dia	1.1024 in (28.0 mm)
Stator Seat Depth	0.0197 in (0.5 mm)
Bearing Pocket Dia	0.3150 +0.0002/-0.0000
Bearing Pocket Depth	0.1024 in (2.6 mm)
Shaft Clearance Hole	Ø0.1654 in
Mount Pattern 1	4× M3 on Ø0.6299 BC
Mount Pattern 2	4× M3 on Ø0.7480 BC
Wire Exit Slot	0.1575 × 0.0787 in
Finish	Hard Anodize Type III, Black

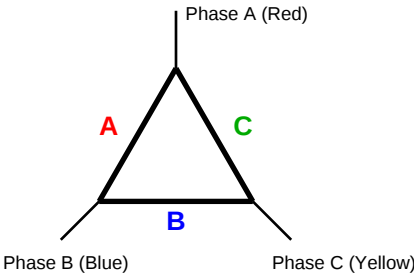
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BASE PLATE DWG: MF-2806-BASE	REV A	SHEET 7/8

WINDING DIAGRAM - ELECTRICAL SPECIFICATIONS

WINDING PATTERN: 12N14P, DELTA, dLRK



DELTA TERMINATION



ELECTRICAL SPECIFICATIONS	
Configuration	12N14P (12 Stator, 14 Rotor)
Termination	Delta (Δ)
Winding Pattern	dLRK (AaBbCc...)
KV Rating	1400 $\pm$ 50 RPM/V
Turns per Tooth	11
Wire Gauge	AWG 24
Wire Type	Polyimide (Kapton) Class H
Phase Resistance	0.065 $\pm$ 0.010 Ω
Phase Inductance	15 $\pm$ 3 μ H
No-Load Current (10V)	0.8 A max
Max Continuous Current	45 A
Max Burst Current (10s)	55 A
Timing	15 $^\circ$ - 22 $^\circ$

- WINDING NOTES:
1. Wind direction: CW looking at tooth tip
 2. Lowercase = reverse wind direction
 3. Tension: 200-300g during winding
 4. Secure ends with high-temp epoxy
 5. Phase wires: 20AWG silicone, 150mm
 6. Test phase-to-phase: no shorts
 7. Final resistance within $\pm$ 15%

MODEL-F PROPULSION
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WINDING DIAGRAM
DWG: MF-2806-WIND

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