

1. Scope

This specification shall define the details of hybrid stepping motor which to be manufactured and delivered by MinebeaMitsumi Inc. stepping motor div.

REFERENCE

2. Electrical characteristics

Rated voltage	3.1 V
Rated current	3.4 A
Max. input	21.1 W
Step angle	1.8 °
Step accuracy(positional)	1.8 ° ± 0.09 ° at Rated current DUAL
Max. holding torque	3.1 Nm [31.6 kgfcm] MIN. at Rated current DUAL
Detent torque	147 mNm [1500 gfcm] REF.
Pull out torque	- mNm [- gfcm] MIN. at - Hz
Pull in torque	- mNm [- gfcm] MIN. at - Hz
Max. no load response	- Hz MIN.
Max. slew speed	- Hz MIN.
Driving condition	DC V A[φ] DUAL
Winding resistance	0.9 Ω ± 0.14 Ω
Winding inductance	6.4 mH REF. at 1 kHz, 1 V[RMS]
Insulation resistance	100M Ω 100M Ω MIN. with DC 500 V insulation resistance tester applied between winding and case.
Dielectric strength	There shall be no breakdown at AC500 V (50 or 60) Hz applied for 60 s between winding and case.
Temperature rise	-
Class of insulation	-
Ambient temperature	0 °C ~ +50 °C

3. Mechanical characteristics

Direction of shaft rotation	Rotation of shaft to be CW facing mounting end when connection FIG.1 and sequenced as FIG. 2.
Radial play	20 μm MAX. at 4.4 N[450 gf] LOAD
End play	0.2 mm MAX. at 49 N[5 kgf] LOAD
Rotor inertia	1200 gcm ² REF.
Mass	1800 g REF.

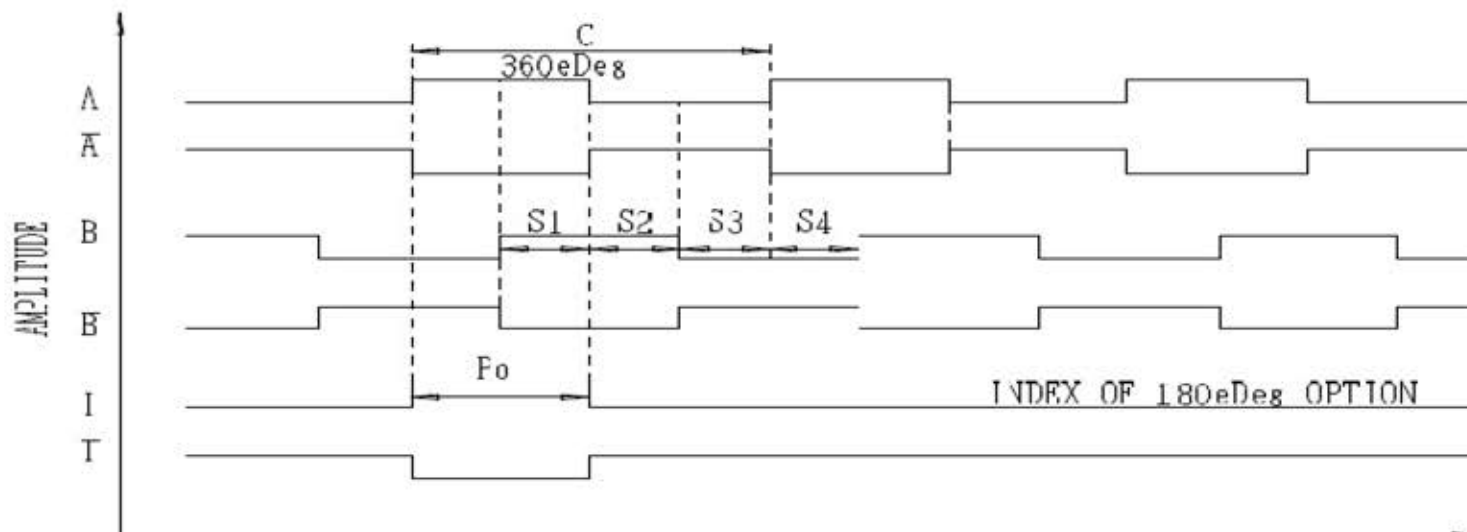
4. Environmental harmony

Composed parts are RoHS compliant.

(i) Encoder specifications

ITEM	Specifications
Encoder type	AVAGO AEDR-8501 Incremental
Detection method	Reflective surface
Output signal	A, \bar{A} , B, \bar{B} , I, \bar{I} (Three channel) Line driver output
Resolution	4,000 CPR
Supply voltage	DC 5 V \pm 0.25 V
Supply current	25 mA REF.
Output voltage	-0.5 V to +5.5 V
Wave form	Rectangle wave
Count frequency	220 kHz MAX. (4X)
State S_1, S_2, S_3, S_4	$(C/4) \pm (C/8)$
Index pulse width P_0	$(C/4) \leq P_0 \leq (3C/4)$
Duty	$(C/2) \pm (C/4)$

OUTPUT WAVE FORM



CODEWHEEL ROTATION MOVEMENT (ANTI-CLOCKWISE)
QUADRATURE SIGNALS A, B and I

STEP	L/W COLOR			
	RED	BLU	YEL	ORG
1	+	+	-	-
2	-	+	+	-
3	-	-	+	+
4	+	-	-	+

FIG. 2

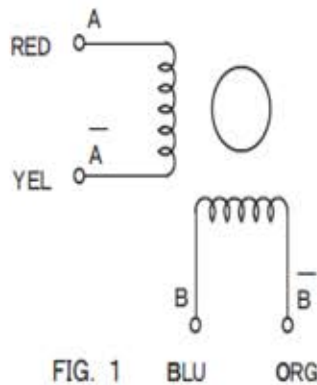
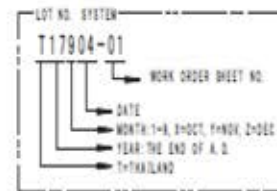
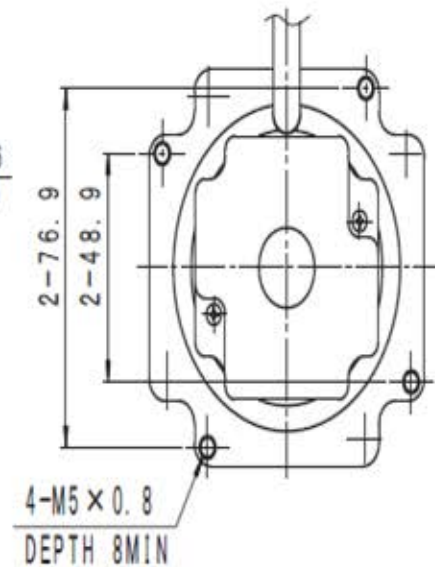
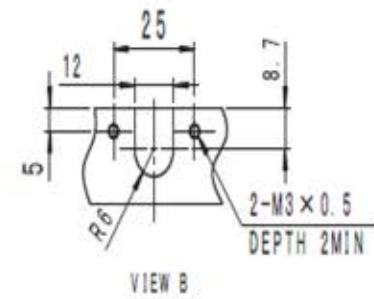
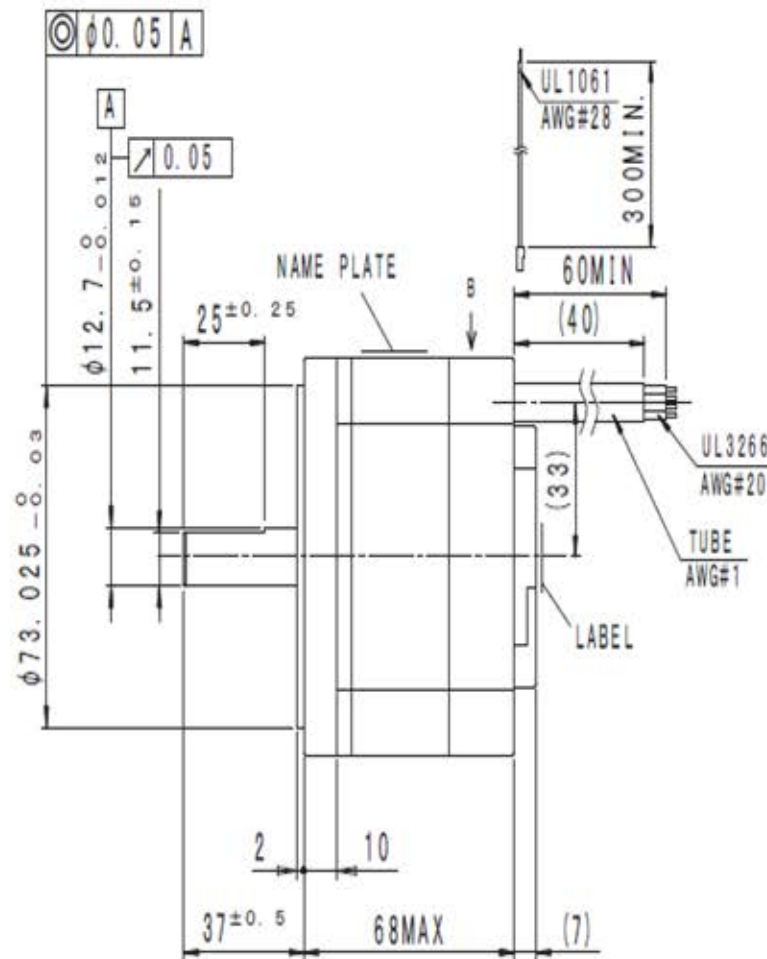
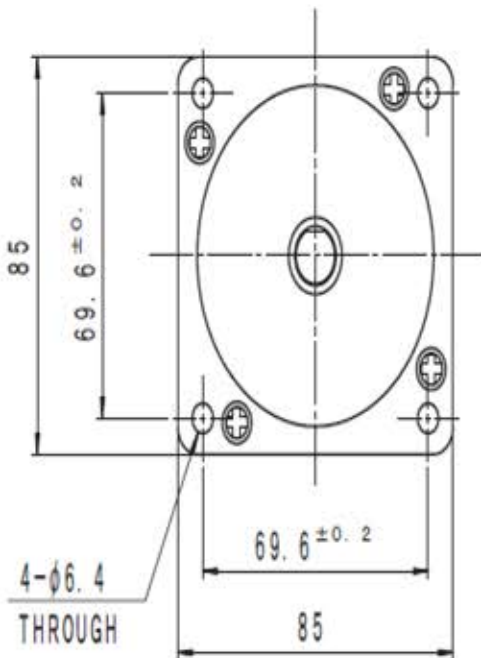


FIG. 1 BLU ORG



FOR ENCODER

PIN NO.	SIGNAL	L/W COLOR
1	Vcc	RED
2	GND	BLK
3	CH. A	WHT
4	CH. \bar{A}	GRN
5	CH. B	BRN
6	CH. \bar{B}	YEL
7	CH. I	BLU
8	CH. \bar{I}	ORG
9	-	-
10	-	-



REFERENCE

					MinebeaMitsumi Inc.		UNIT: mm		MATERIAL		DATE: SEP. /04/'17	
							SCALE		SURF. ROUGH		DESCRIPTION: HYBRID STEP MOTOR	
					APPROVED		DRAWN		HEAT / REAT		PART NO. (MODEL NO.)	
					HSD		IGRS		FINISH		DRAWING NO.	
					SMZ		TOL.				SHEET: 1/1	
					MARK		DATE		REASON		REV.	
					EDN NO.		ENGINEER		APPROVED			