

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.

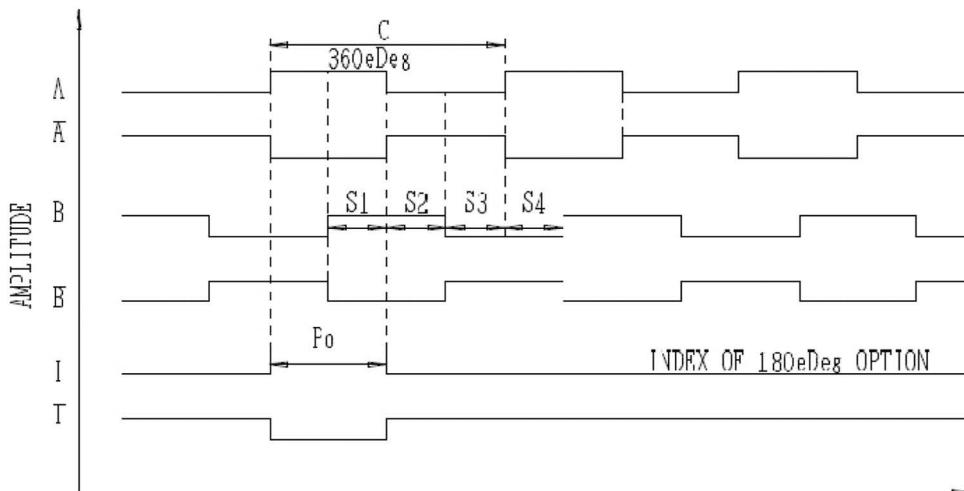
Special specifications

REFERENCE

(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

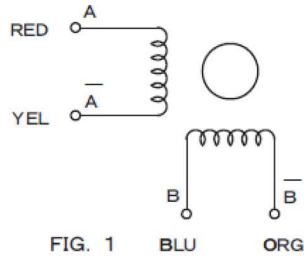
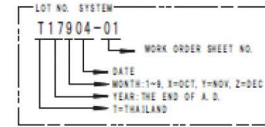
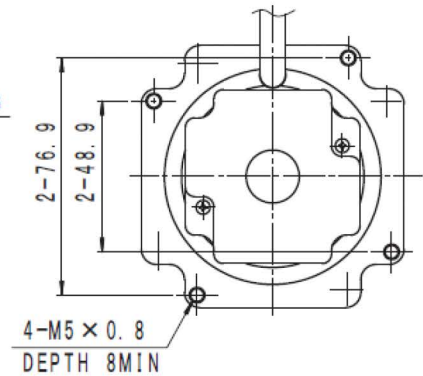
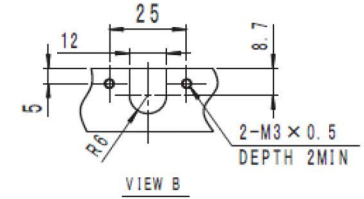
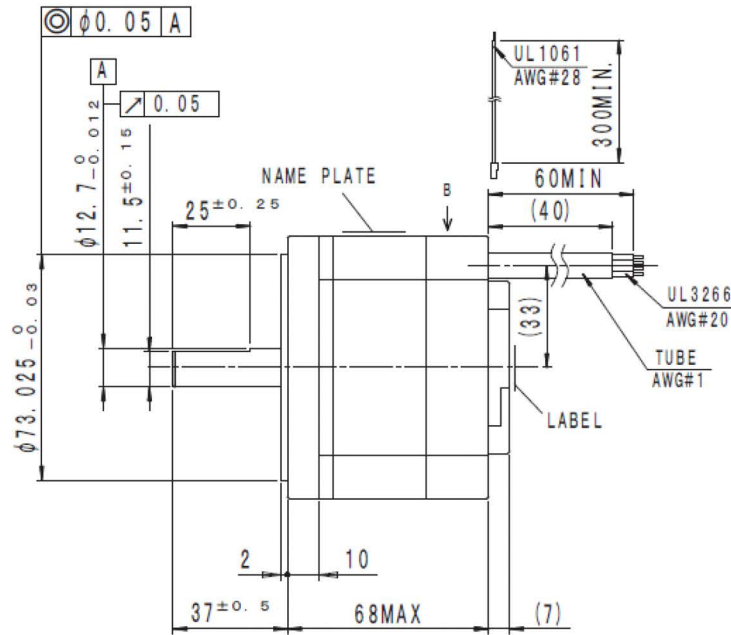
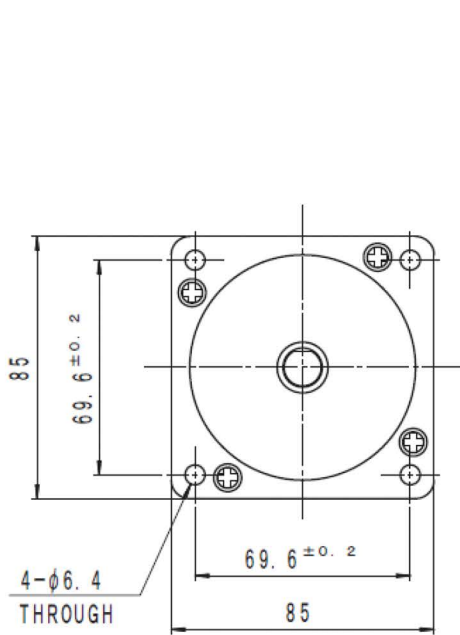


FIG. 1



FOR ENCODER

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



REFERENCE

DATE		SEP. /04/' 17		UNIT		MATERIAL		DATE		SEP. /04/' 17	
REASON		EON NO.		ENGINEER		APPROVED		DESCRIPTION		HYBRID STEP MOTOR	
MARK		DATE		REASON		EON NO.		PART NO. (MODEL NO.)		SHEET	
HSD		IGRS		SMZ		TOL.		DRAWING NO.		1 / 1	
APPROVED		CHECKED		DRAWN		SCALE		HEAT TREAT		REV.	
0.5 < L ≤ 3		±0.2		3 < L ≤ 6		±0.3		FINISH			
6 < L ≤ 30		±0.5		30 < L ≤ 120		±1.0					
120 < L ≤ 400		±1.2		400 < L ≤ 1000		±1.5					