1. Product Description

Model Number: Stepping Motor T8LNP-60

2. Motor Characteristics

Electrical Characteristics

[Measurement Conditions]

- Motor Configuration: Horizontal output shaft
- Temperature/Humidity: Measurement is, in principle, performed at -10°C~50°C and relative humidity of 30~90%. If in doubt, use the JIS standard temperature state (25 ±2°C, 65 ±5%).
- Standard Drive Circuit: LB1836M (Sanyo)

Item	Content	Notes
Model	PM-Type Stepping Motor	
No. of Phases	2	
Number of Magnetic Poles Applied to Rotor	10	
Basic Step Angle	18° (2-phase excitation)	
Rated Voltage	DC 6.5V	
Excitation Method	2-phase bipolar excitation	
Coil Resistance	60 ±10%Ω/Phase	25°C conversion value
Insulation Class	E Class 115°C	
Insulation Resistance	At least 10MΩ at 50V DC	
Insulation Resistance	1 min. at 50V AC	
Coil Inductance	10.5mH/Phase ±20% (Reference value) (at 1KHz, 1Vrms)	Temperature 25 ±2°C Humidity 65 ±5%

Mechanical Characteristics

Item	Content	Notes
Motor Configuration	Omnidirectional	
Usage Temperature/ Humidity Range	–20~70°C	
Storage Temperature Range	–40~80°C	(Standard temperature of 20°C and relative humidity of 65% assumed)
Rotation Direction	Bi-directional Rotation	The sequence is shown in the diagram on Page 6.
Rotor Inertia	0.0093g•cm^2	Calculated Value
Pull-in Torque	At least 0.30mN• m	V = 6.5V, (between the motor terminals) 2-phase excitation, 500pps
Maximum Response Frequency	At least 2000pps (zero load)	V = 6.5V, (between the motor terminals)
Maximum Actuation Frequency	At least 1000pps (zero load)	2-phase excitation
Holding Torque	At least 0.6mN• m	Temperature 25 ±2°C Humidity 65 ±5% V=5.0V, (between the motor terminals) 2-phase excitation
Detent Torque	Less than 0.20mN• m	
Noise	Less than 55dB	V = 6.5V, (between the motor terminals) 2-phase excitation, 500pps Measurement Environment In an environment with a noise level of less than 25dB, set a noise measurement device equipped with a photocoupler to the A range, then perform measurement with a distance of 1cm from the photocoupler to the motor.
Vibration	Less than 6.0m/s^2	V = 6.5V, (between the motor terminals)

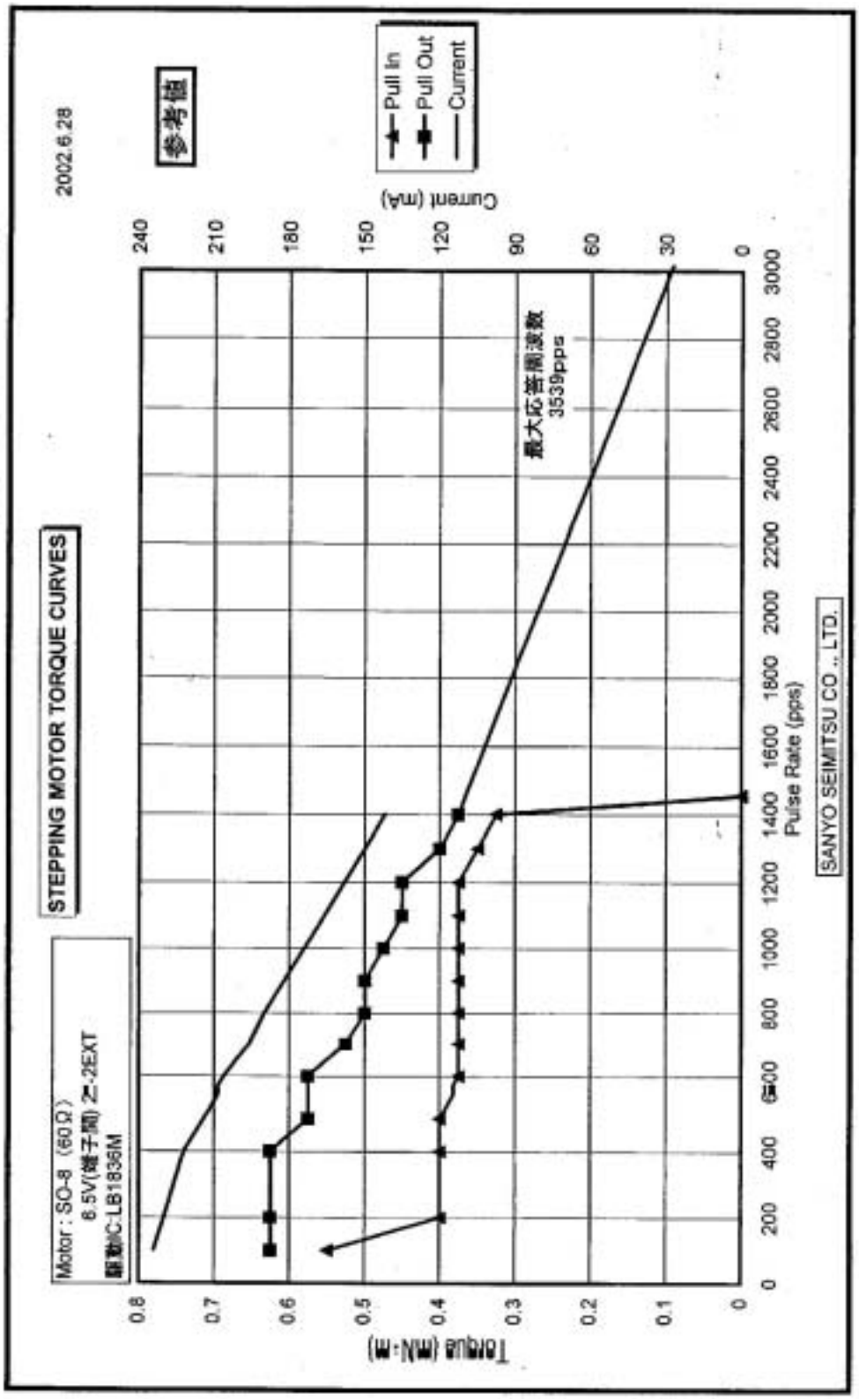
Reliability

Item	Conditions/Test Environment	Determination Standard
Operation Lifetime Testing	–10°C: 20,000 rotations Room Temperature: 30, 000 rotations 50°C: 20,000 rotations Operation. Filter: Open Closed Assumes a 2 second rest.	Perform testing at the conditions at left with the actual device provided by Sanyo Electric. After testing, the determination standards table should be satisfied.
Thermal Shock Test	Performed for 100 cycles with a pattern of -20°C: 30 minutes, 60°C: 30 minutes.	Should satisfy the determinations standards table after 1 hour or more placement at normal temperature and humidity.
Low Temperature Testing	Temperature: -40 ±2°C Storage Time: 72 Hours	Should satisfy the determinations standards table after 1 hour or more placement at normal temperature and humidity.
High Temperature Testing	Temperature: 80 ±2°C Storage Time: 168 Hours	Should satisfy the determinations standards table after 1 hour or more placement at normal temperature and humidity.
Humidity Resistance Testing	Temperature: 40 ±2°C Humidity: 90% Placement Time: 168 Hours	Should satisfy the determinations standards table after 1 hour or more placement at normal temperature and humidity.
Temperature Characteristics Testing	Temperature: -20 ±2°C 70°C: ±2 Placement Time: 5 Hours	Should satisfy the determination standards table under the environment at left.
Vibration Testing	Fix the motor to a jig No. of Vibrations: 1000 c.p.m. Amplitude: 3mm Direction: X, Y, Z Time: 30 minutes in each direction	Should satisfy the determination standards table.
Drop Testing	With the motor in its smallest packaging state, perform a free-fall drop once onto each of the six sides onto a concrete bed from a height of 80cm.	Should satisfy the determination standards table.
Solder Temperature Resistance	On the input terminals: Temperature: 350 °C Time: 3 sec. Solder Type: 60% eutectic solder	Should satisfy the determination standards table.
Solderability	On the input terminals: Temperature: 230 ±5°C Time: 5 sec. Solder Type: 60% eutectic solder	Should be covered by at least 95% new solder. The flux should be a rosin-type.

Reliability Determination Standards Table

Reliability Item		1 Operation Lifetime Testing	2 Thermal Shock Test	3 Low Temperature Testing	4 High Temperature Testing	5 Humidity Resistance Testing	6 Temperature Characteristics Testing	7 Vibration Testing	8 Drop Testing	9 Solder Temperature Resistance
Number	Characteristic Item									
7	Pull-in Torque	○	○	○	○	○	○	○	○	○
1	Coil Resis-tance	○	NA	NA	NA	NA	NA	NA	NA	NA
3	Insulation Resistance	○	NA	NA	NA	NA	NA	NA	NA	NA
8	Maximum Response Frequency	○	○	○	○	○	○	○	○	○
9	Maximum Actuation Frequency	○	○	○	○	○	○	○	○	○

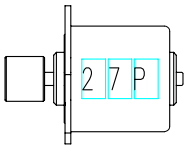
*Note: Reliability Determination Standard 1 is determined by 5 samplings where AC = 0 and RE = 1.


STEPPING MOTOR TORQUE CURVES
2002.6.28
参考値
Motor : SO-8 (60Ω)
8.5V(端子間) 2-2EXT
駆動IC:LB1836M
Pull In
Pull Out
Current
Torque (mN・m)
Current (mA)
Pulse Rate (pps)
最大応答周波数
3539pps
SANYO SEIMITSU CO.,LTD.

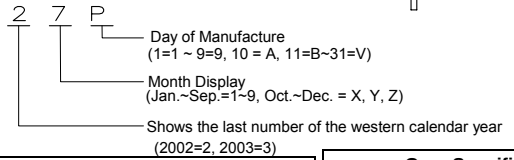
Note	History	Date	Name
△	Based on FM014300	7/4/02	Ichikawa (Shin)
△1	Note Changes	11/11/02	Ichikawa (Shin)

Lot No. Print Position

The Lot No. is displayed on the inner side of the motor terminal
The Lot No. Print Color: Black



The Lot No. Print Method



Note)
1. There should be no burrs on the gear teeth
2. The gear teeth should be $\sqrt{32}$
3. The gear pull-out strength should be at least 30.0N △
4. The maximum shaft thrust play is 0.3
5. There should be no obvious deformation or damage in the motor appearance.
6. The FPC should be attached at delivery and the dimensions should be according to the FPC drawing (T06062200)

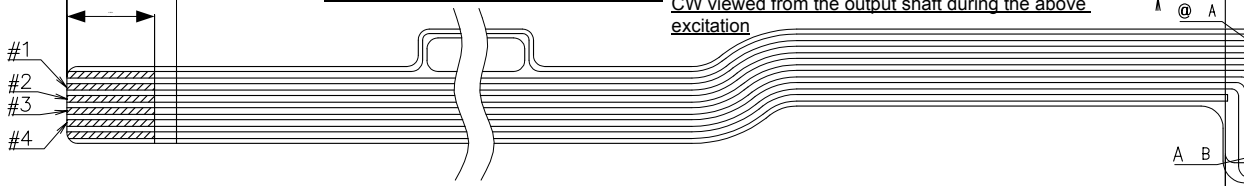
Gear Specifications		
Gear Tooth Type		Involute
Tool	Gear Shape	Parallel
	Module	0.25
	Pressure Angle	20°
	No. of Teeth	10
Standard Pitch Diameter		ϕ2.5
Outer Diameter		$\phi 3.14^{+0.0}_{-0.0}$
Head Gap		–
Gear Constant		0.3
Rotation		–
Displacement		$1.193^{-0.0}_{-0.0}$

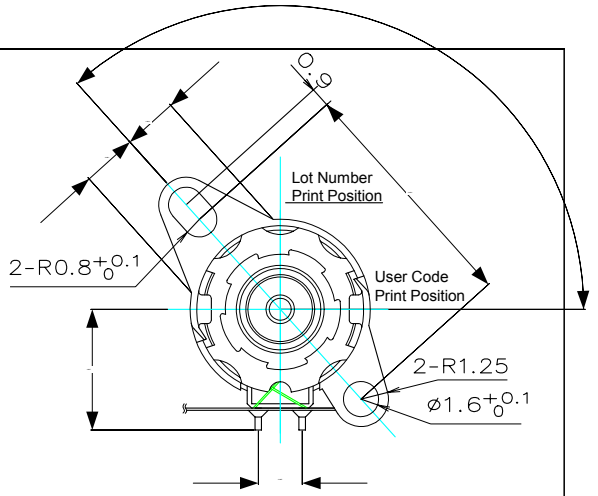
Gear Specifications	
Displacement Count	2
Tooth Bottom Diameter	ϕ2.025
Tooth Bottom R	(0.375m)
Material	C3604BD
Precision	JIS Class 5

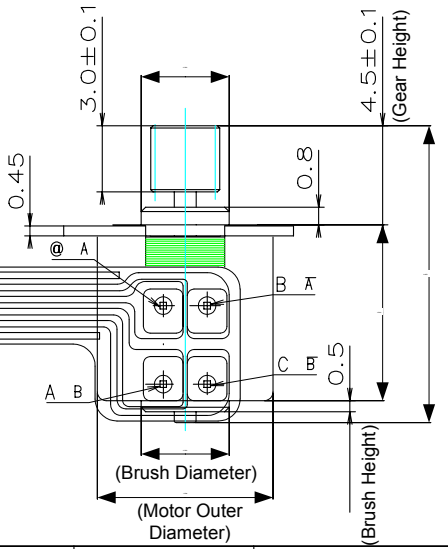
Sequence

FPC No.	Terminal No.	Step 1	2	3	4
#2	@	+	-	-	+
#3	A	-	-	+	+
#4	B	-	+	+	-
#5	C	+	+	-	-

CW viewed from the output shaft during the above excitation

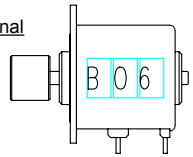






User Code Print Position

The user code is positioned 90° from the motor terminal
Print Color: Black
User Code Display Method: B06



Device Name	S0-8		User Code	B06000
Dimetric Projection	Scale 5/1	General Tolerance ±0.5	General Specs. ——	MOTOR OUTLINE FIGURE
2002.06.17				

Designed	Drafted	Checked	Reviewed	Approved	Parts Code
Engineering 02.06.17 Ichikawa Shin	Engineering 02.06.17 Ichikawa Shin	Engineering 02.07.12 Matsubara	Engineering 02.07.12 Kinoshita	Engineering 02.07.12 Yagi	M 0 1 2 5 5 0 0 0

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