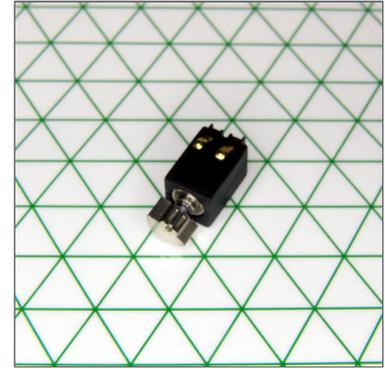


Product Data Sheet

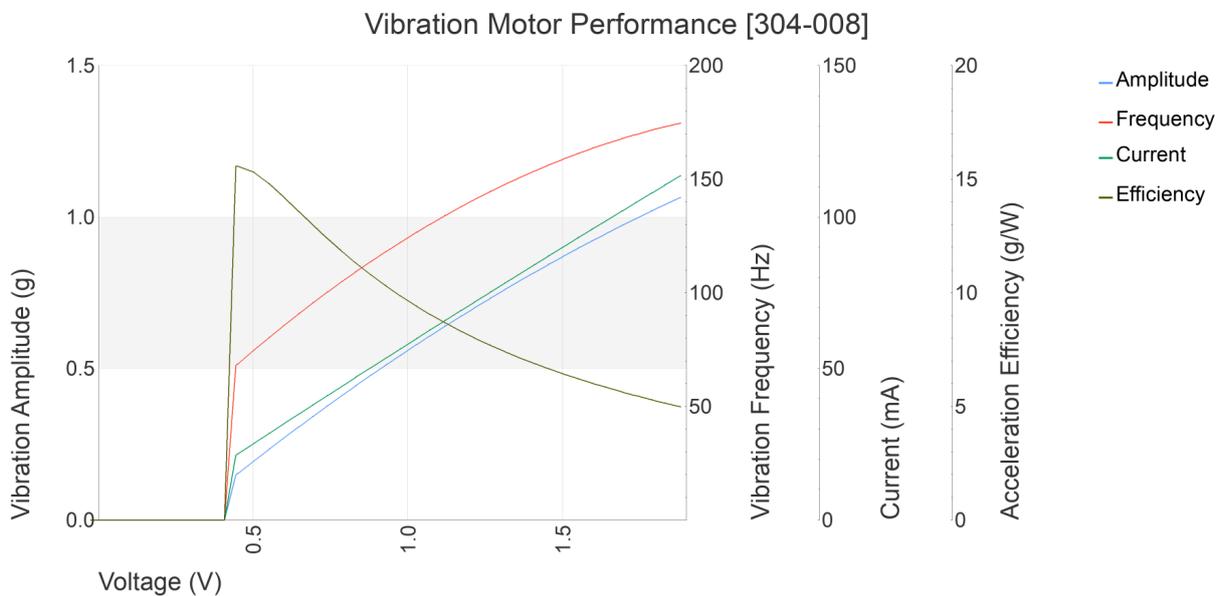
Range: Pico Vibe
 Title: 4mm Vibration Motor
 Type: Undefined
 Model: 304-008

4mm Vibration Motor
 9mm Type
 Shown on 6mm Isometric Grid



KEY FEATURES	
Body Diameter	4 mm [+/- 0.2]
Body Length	8.6 mm [+/- 0.2]
Ecc. Weight Radius	2.5 mm [+/- 0.2]
Ecc. Weight Length	2.8 mm [+/- 0.2]
Shaft Orientation	Inline
Rated Operating Voltage	1.5 V
Rated Vibration Speed	9,500 rpm [+/- 1,900]
Typical Rated Operating Current	82 mA
Typical Norm. Amplitude	0.91 G

TYPICAL DC MOTOR PERFORMANCE CHARACTERISTICS



ORDERING INFORMATION

The model number fully defines the model, variant and additional features of the product. Please quote this number when ordering. For stocked types, testing and evaluation samples can be ordered directly through our online store.

FIND OUT HOW THIS PART COULD MEET YOUR SPECIFICATIONS

Email: enquiries@precisionmicrodrives.com
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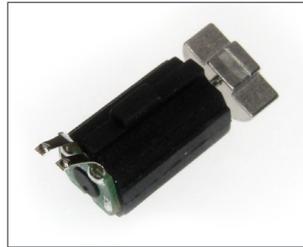
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DESIGN FOR APPLICATION CASE STUDIES



ENCAPSULATED VIBRATION MOTOR FOR A CPR TRAINING DUMMY

- Low volume, high value manufacturing
- Custom CNC machined enclosure
- Optimised haptic performance
- Custom PCB including EMI filters
- Part no. 334-401.001



VIBRATION MOTOR HIGHLY OPTIMISED FOR RUGGEDISED FIRE AND POLICE EMERGENCY RADIOS

- High volume production
- Optimised for emergency services application
- Ruggedised design with custom rubber 'suspension' cover
- Custom PCB with spring legs for simplified production assembly times
- Part no. 308-104.001



PRECISION SPEED AND TORQUE CONTROLLED SERVO WITH INTEGRATED TUNABLE PID LOOP FOR SINGLE-USE SCIENTIFIC INSTRUMENT.

- Medium volume, high value assembly
- Proprietary PID controller converts cost-effective motor design into a precision servo
- Adapted control software including digital IO (to customer's specification)
- Part no. 132-100.001



CUSTOMISED PRECISION GEAR MOTOR WITH ROBUST OPTICAL ENCODER

- High volume production
- Application specific output shaft
- Tailored motor performance curves
- Rear motor shaft with noise resistant optical encoder
- Part no. 212-116.001

PHYSICAL SPECIFICATION

PARAMETER	CONDITIONS	SPECIFICATION
Body Diameter	Max body diameter or max face dimension where non-circular	4 mm [+/- 0.2]
Body Length	Excl. shafts, leads and terminals	8.6 mm [+/- 0.2]
Unit Weight		1 g
Mounting	See drawing for details	Spring Terminals
No. of Output Shafts		1
Ecc. Weight Radius	Radius from shaft for non-cylindrical weights	2.5 mm [+/- 0.2]
Ecc. Weight Length		2.8 mm [+/- 0.2]
Shaft Orientation		Inline

CONSTRUCTION SPECIFICATION

PARAMETER	CONDITIONS	SPECIFICATION
Motor Construction		Coreless
Commutation		Precious Metal Brush
No. of Poles		3
Bearing Type		Sintered Bronze

OPERATIONAL SPECIFICATION

PARAMETER	CONDITIONS	SPECIFICATION
Rated Operating Voltage		1.5 V
Rated Vibration Speed	At rated voltage using the inertial test load	9,500 rpm [+/- 1,900]
Max. Rated Operating Current	At rated voltage using the inertial test load	116 mA
Max. Start Voltage	With the inertial test load	1.1 V
Rated Inertial Test Load	Mass of standard test sled	100 g
Max. Operating Voltage		1.8 V
Min. Vibration Amplitude	Peak-to-peak value at rated voltage using the inertial test load	0.56 G
Max. Start Current	At rated voltage	143 mA
Min. Insulation Resistance	At 50V DC between motor terminal and case	10 MOhm

FIND OUT HOW THIS PART COULD MEET YOUR SPECIFICATIONS
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Important: The characteristics of the motor is the typical operating parameters of the product. The data herein offers design guidance information only and supplied batches are validated for conformity against the specifications on the previous page.

TYPICAL PERFORMANCE CHARACTERISTICS

PARAMETER	CONDITIONS	SPECIFICATION
Typical Rated Load Power Consumption	At rated voltage and load	135 mW
Typical Rated Operating Current	At rated voltage using the inertial test load	82 mA
Typical Vibration Amplitude	Peak-to-peak value at rated voltage using the inertial test load	0.91 G
Typical Start Current	At rated voltage	111 mA
Typical Vibration Efficiency	At rated voltage using the inertial test load	7.4 G/W
Typical Norm. Amplitude	Peak-to-peak vibration amplitude normalised by the inertial test load at rated voltage	0.91 G
Typical Start Voltage	With the inertial test load	0.4 V
Typical Terminal Resistance		13 Ohm
Typical Terminal Inductance		34 uH

TYPICAL HAPTIC CHARACTERISTICS

PARAMETER	CONDITIONS	SPECIFICATION
Typical Lag Time	At rated voltage using the inertial test load	14 ms
Typical Rise Time	At rated voltage using the inertial test load	47 ms
Typical Stop Time	At rated voltage using the inertial test load	83 ms
Typical Active Brake Time	Time taken from steady-state to 0.04 G under inverse polarity at max. voltage	22 ms

TYPICAL DURABILITY CHARACTERISTICS

PARAMETER	CONDITIONS	SPECIFICATION
Typical Min. Counterweight Pullout		9.8 N

ENVIRONMENTAL CHARACTERISTICS

PARAMETER	CONDITIONS	SPECIFICATION
Max. Operating Temp.		60 Deg.C
Min. Operating Temp.		-20 Deg.C
Max. Storage & Transportation Temp.		80 Deg.C
Min. Storage & Transportation Temp.		-40 Deg.C

FIND OUT HOW THIS PART COULD MEET YOUR SPECIFICATIONS

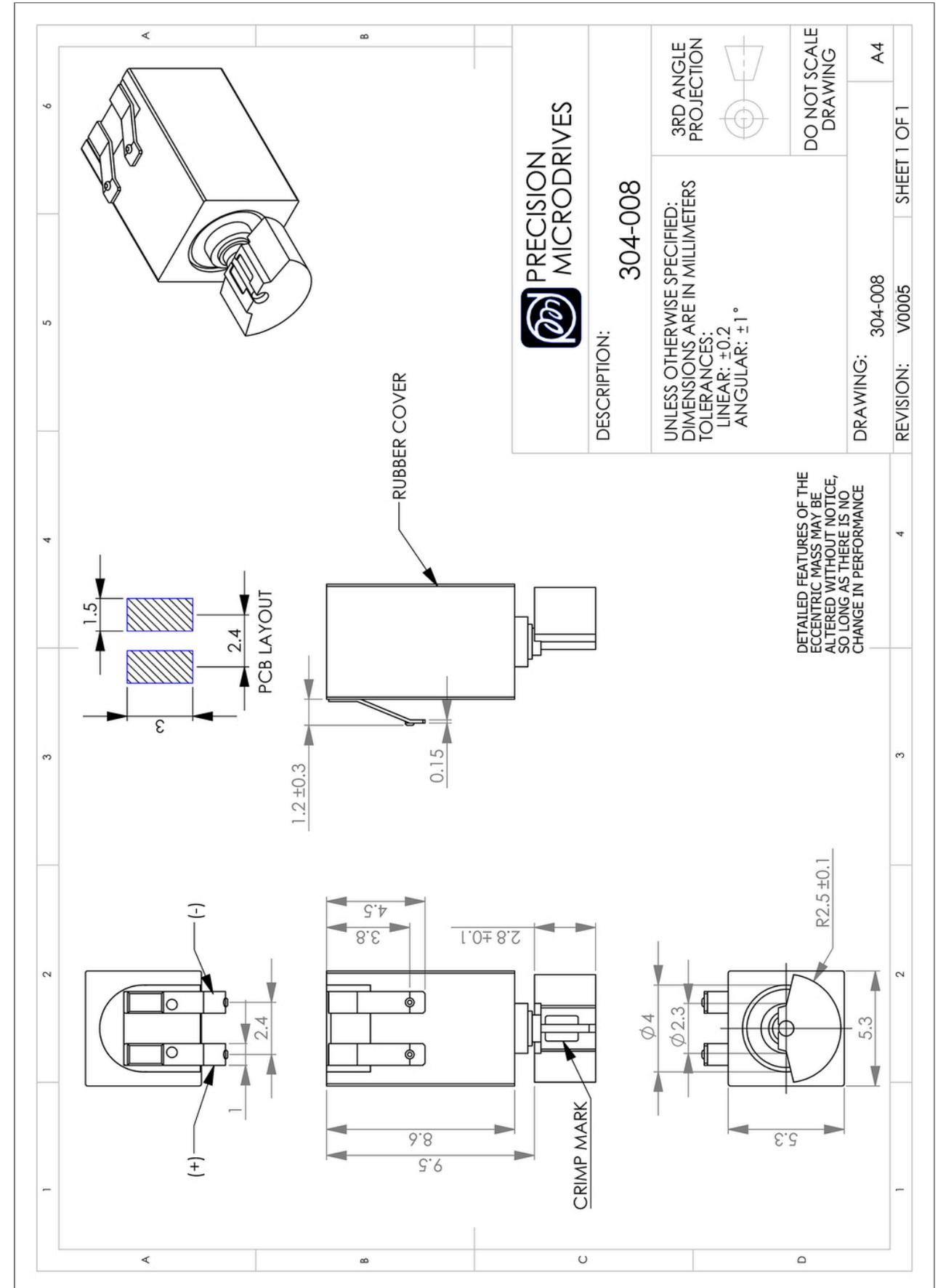
Email: enquiries@precisionmicrodrives.com
Call: +44 (0) 1932 252482

TYPICAL PACKING CONDITIONS

PARAMETER	CONDITIONS	SPECIFICATION
Carton Type		Boxed Trays

FIND OUT HOW THIS PART COULD MEET YOUR SPECIFICATIONSEmail: enquiries@precisionmicrodrives.com
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PRODUCT DIMENSIONAL SPECIFICATION



FIND OUT HOW THIS PART COULD MEET YOUR SPECIFICATIONS

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Reliability Analysis

This section presents information regarding the longevity test performed on the motor. The Mean Time to Failure reported in this page should not be interpreted as a guaranteed lifetime. Please check our Application Notes for further information.

Our longevity test consists of powering the motors at their rated voltage for 2 seconds, then turning them off for 2 seconds. This cycle is repeated over the total test time.

The test is performed by our custom longevity machine which drives the motors and collects performance data. The test parameters and results can be seen below.



Test Parameters

- Motors tested: 48
- Test time: 720 hours
- Cycle period: 4 seconds
- Duty cycle: 50%
- Test voltage: 1.5 V
- Temperature: 31 °C

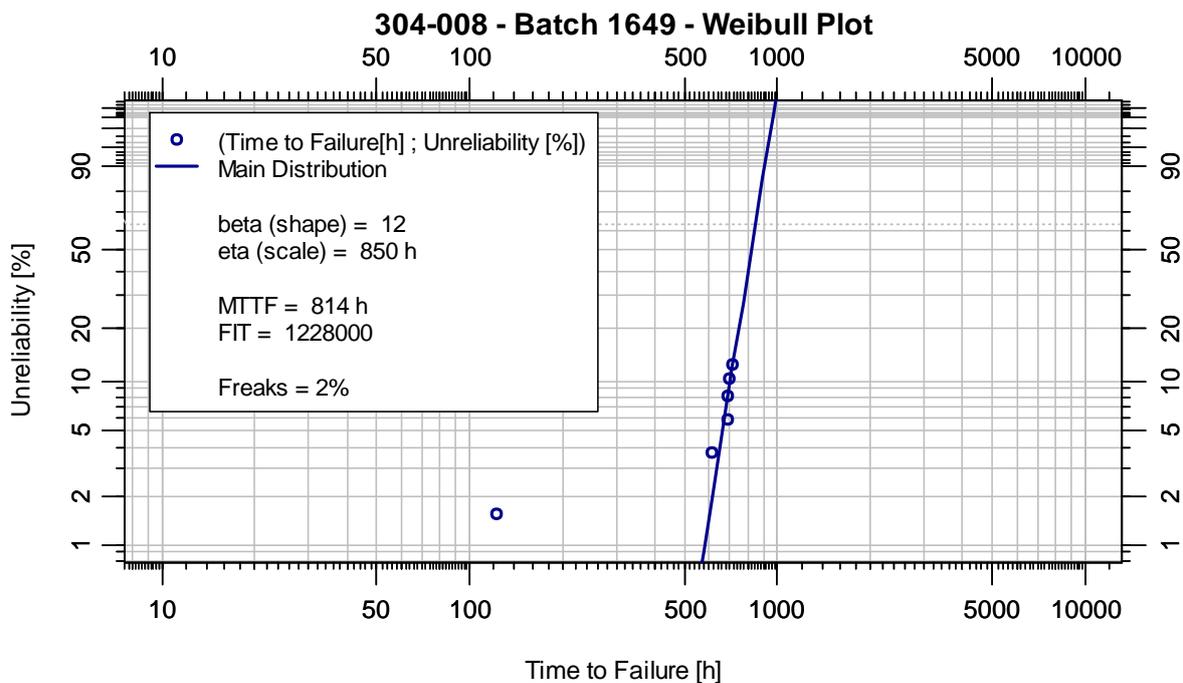
Formulas to derive the key reliability figures from a Weibull distribution:

$$MTTF = \eta * \Gamma\left(1 + \frac{1}{\beta}\right)$$

$$FIT = 10^9 / MTTF$$

Test Result

The results for the longevity test are presented in a Weibull plot. From the fitting distribution it is possible to obtain an estimate of the Mean Time to Failure.



FIND OUT HOW THIS PART COULD MEET YOUR SPECIFICATIONS

Email: enquiries@precisionmicrodrives.com
Call: +44 (0) 1932 252482

HOW TO ORDER

Call or email us with your order requirements at:

Email: **enquiries@precisionmicrodrives.com**

Phone: **+44 (0) 1932 252482**

Please quote the full part number when ordering or making an enquiry. Some products can be ordered in smaller volumes directly from our website: **www.precisionmicrodrives.com**

DATASHEET REVISION AND VERSION NUMBERING

We aim to provide our customer with the most detailed product information available. Sometimes changes are necessary, and these will be controlled by our engineering change request and notification process. To track datasheet versions we use both a 'production revision number' and a 'document version number'. These can be found at the bottom of every page. In some cases, such as documentation errors, the document version number can increase without triggering a product revision.

LIFE SUPPORT AND MISSION CRITICAL APPLICATION POLICY

PRECISION MICRODRIVES PRODUCTS ARE NOT AUTHORISED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR OTHER CRITICAL APPLICATION SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF PRECISION MICRODRIVES LIMITED.

As used herein:

1. Life support devices or systems are devices or systems which,
 - 1.1. are intended for surgical implant into the body, or
 - 1.2. support or sustain life, and whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user or a third party.
2. A critical component is any component of a life support device or any other system or machine whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

BATCH NUMBERING, MANUFACTURING, TRACEABILITY AND LABELLING

Every part manufactured by Precision Microdrives is at minimum identified and traced via a batch number. Where physically practical, we try to make each part with a batch number. In addition, some parts carry a lot code or barcode serial numbers. If traceability is a core requirement for your purchase, let us know and we'll outline the production options for you.

STANDARD QUALITY CONTROLS AND ISO 9001

Precision quality control is one of our 3 key competitive advantages. All motors that we produce undergo 100% line inspection followed by strict and detailed batch sample testing in accordance with ISO 2859. All of the processes operated at Precision Microdrives are managed within our ISO 9001 quality system.



Precision Microdrives Limited
Unit 1.07, Canterbury Court
1-3 Brixton Road
London
SW9 6DE
United Kingdom

Tel: +44 (0) 1932 252482

Fax: +44 (0) 1932 325353

Email: enquiries@precisionmicrodrives.com

Web: www.precisionmicrodrives.com

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