

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



**PRECISION
MICRODRIVES™**

Product Data Sheet

Pico Vibe™

4mm Vibration Motor - 6mm Type

Model: 304-103

Ordering Information

The model number 304-103 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.

Datasheet Versions

It is our intention to provide our customers with the best information available to ensure the successful integration between our products and your application. Therefore, our publications will be updated and enhanced as improvements to the data and product updates are introduced.

To obtain the most up-to-date version of this datasheet, please visit our website at:

www.precisionmicrodrives.com

The version number of this datasheet can be found on the bottom left hand corner of any page of the datasheet and is referenced with an ascending R-number (e.g. R002 is newer than R001). Please contact us if you require a copy of the engineering change notice between revisions.

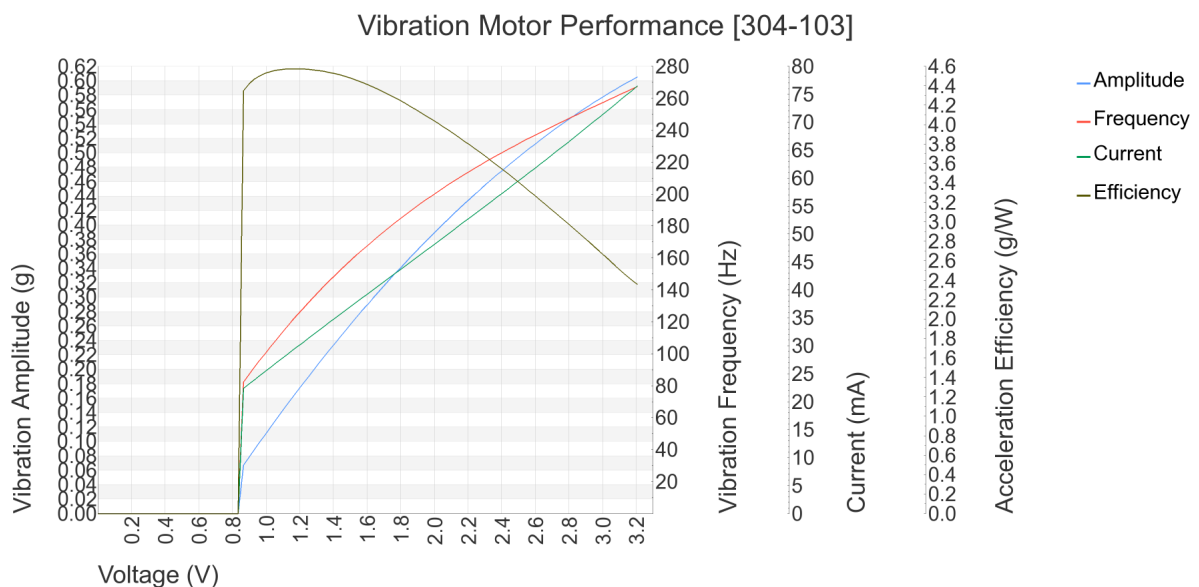
If you have any questions, suggestions or comments regarding this publication or need technical assistance, please contact us via email at:

enquiries@precisionmicrodrives.com or call us on +44 (0) 1932 252 482

Key Features

| | |
|----------------------------------|------------------------|
| Body Diameter: | 4.4 mm [+/- 0.2] |
| Body Length: | 6 mm [+/- 0.2] |
| Counterweight Radius: | 1.7 mm [+/- 0.1] |
| Counterweight Length: | 2.8 mm [+/- 0.1] |
| Shaft Orientation: | Inline |
| Rated Operating Voltage: | 2.7 V |
| Rated Vibration Speed: | 14,000 rpm [+/- 3,000] |
| Typical Rated Operating Current: | 65 mA |
| Typical Normalised Amplitude: | 0.5 G |

Typical Vibration Motor Performance Characteristics



Understanding Precision Microdrives Specification and Production Stages

Precision Microdrives Specification Stages

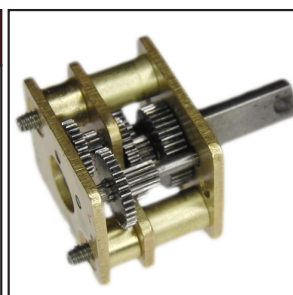
Precision Microdrives is run on processes and we guide all customers through sets of predefined specification stages as they move from prototype to production. These are designed to allow the flexibility to iterate designs with the eventual certainty required for production parts.

| Base | Sampling | Pre-Production | Production | EOL |
|---|--|--|---|--|
| Used for factory downselection Typically 0 units | Used for validating prototypes Typically ~ 10 units | Used for validating initial production Typically ~ 1k units | Used for validating mass production Typically >5k+ units | Used as basis for product replacement 'Base' spec Typically 0 units |

Precision Microdrives Capabilities and Competences

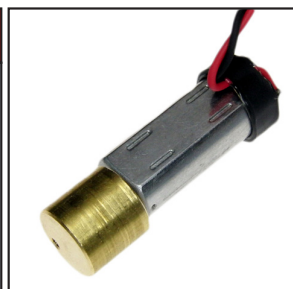
Precision Motor Testing and Motor Testing Services

When we started PMD there were no commercial testing machines available, so we built our own. Ever since we've continued to develop new motor testing machines & procedures each year. Fast forward to today and we now have the most extensive testing facilities in the world for sub 40mm diameter motors, gear motors and vibration motors. These are used to validate motors through specification stages and during manufacturing. We also test motors as a service, provide easy to read reports and assist customers with their interpretation.



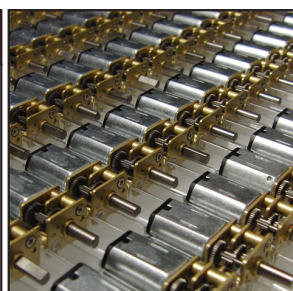
Motor Customisation, Design, and Manufacturing

To be useful motors need to be integrated with other parts, such as housings or couplings. We routinely develop and produce complete assemblies, from motors with customised leads or connectors to complete electromechanical mechanisms and integrated control electronics. We will support and guide you through the specification stages from prototype to signing-off for mass production.



Competent and Dependable Supply Chains for Production

Most of the world's miniature motors are made in Asia, and you need engineers on the factory floor who can maintain the Western values of "doing things right" whilst supporting the Asian values of "getting things done". As a customer you are supported by expert eyes, right at the heart of the manufacturing process where it is needed: On the ground in the UK, Hong Kong, and China.



Quality Engineers on the Ground and Local Engineering Teams

The nature of our business is to confidently produce and supply motors 'On time & To spec'. Our customers benefit from our certified ISO 9001 quality systems, reliable motor production infrastructure, and experience. We have a core competence in helping customers design out over-specified and expensive European drives, with more cost-effective, adequately specified, and verified Asian alternatives.



Physical Specification

| PARAMETER | CONDITIONS | SPECIFICATION |
|----------------------|--|---------------------|
| Body Diameter | Max body diameter or max face dimension where non-circular | 4.4 mm [\pm 0.2] |
| Body Length | Excl. shafts, leads and terminals | 6 mm [\pm 0.2] |
| Unit Weight | | 0.6 g |
| Mounting | See drawing for details | PCB SMD Reflow |
| No. of Output Shafts | | 1 |
| Counterweight Radius | Radius from shaft for non-cylindrical weights | 1.7 mm [\pm 0.1] |
| Counterweight Length | | 2.8 mm [\pm 0.1] |
| 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 | | 2.7 V |
| Rated Vibration Speed | At rated voltage using the inertial test load | 14,000 rpm [\pm 3,000] |
| Max. Rated Operating Current | At rated voltage using the inertial test load | 75 mA |
| Rated Inertial Test Load | Mass of standard test sled | 100 g |
| Min. Vibration Amplitude | Peak-to-peak value at rated voltage using the inertial test load | 0.35 G |
| Max. Start Voltage | With the inertial test load | 1.8 V |
| Max. Operating Voltage | | 3.2 V |
| Max. Start Current | At rated voltage | 90 mA |
| Min. Insulation Resistance | At 50V DC between motor terminal and case | 1 MOhm |

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 Power Consumption | At rated voltage and load | 176 mW |
| Typical Rated Operating Current | At rated voltage using the inertial test load | 65 mA |
| Typical Vibration Amplitude | Peak-to-peak value at rated voltage using the inertial test load | 0.5 G |
| Typical Start Current | At rated voltage | 85 mA |
| Typical Vibration Efficiency | At rated voltage using the inertial test load | 2.8 G/W |
| Typical Normalised Amplitude | Peak-to-peak vibration amplitude normalised by the inertial test load at rated voltage | 0.5 G |
| Typical Start Voltage | With the inertial test load | 1 V |
| Typical Terminal Resistance | | 34 Ohm |
| Typical Terminal Inductance | | 600 uH |

Typical Haptic Characteristics

| PARAMETER | CONDITIONS | SPECIFICATION |
|---------------------------|---|---------------|
| Typical Lag Time | At rated voltage using the inertial test load | 27 ms |
| Typical Rise Time | At rated voltage using the inertial test load | 39 ms |
| Typical Stop Time | At rated voltage using the inertial test load | 30 ms |
| Typical Active Brake Time | Time taken from steady-state to 0.04 G under inverse polarity at max. voltage | 18 ms |

Typical Durability Characteristics

| PARAMETER | CONDITIONS | SPECIFICATION |
|------------------------------------|------------|---------------|
| Typical Min. Counterweight Pullout | | 50 N |

Environmental Characteristics

| PARAMETER | CONDITIONS | SPECIFICATION |
|----------------------|------------|---------------|
| Min. Operating Temp. | | -20 Deg.C |
| Max. Operating Temp. | | 70 Deg.C |
| Min. Storage Temp. | | -40 Deg.C |
| Max. Storage Temp. | | 85 Deg.C |

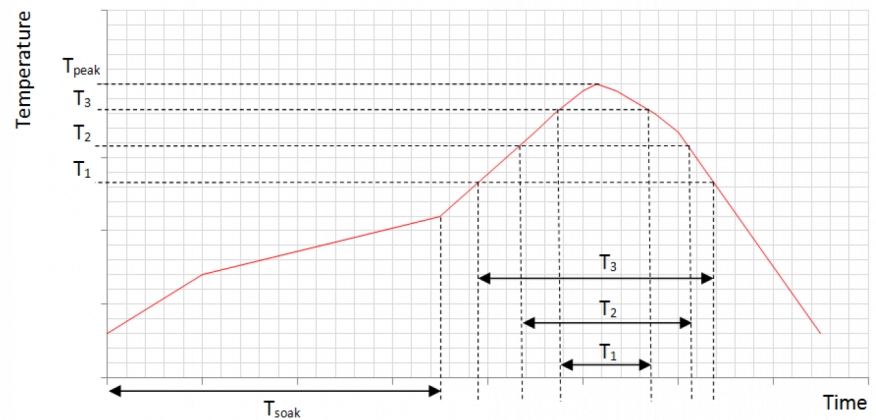
Typical Packing Conditions

| PARAMETER | CONDITIONS | SPECIFICATION |
|-------------|------------|---------------|
| Carton Type | | Reel (Ø33cm) |

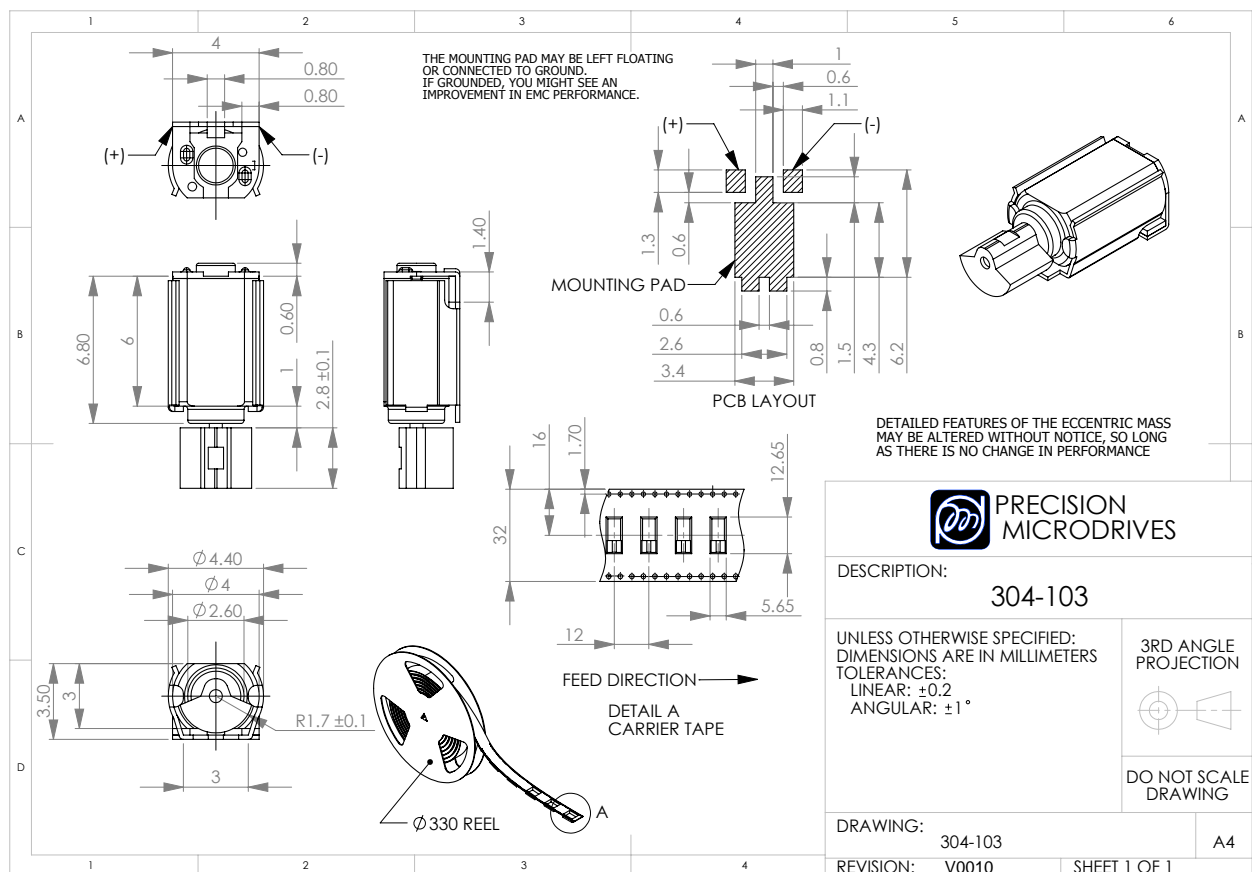
Additional Specifications

Reflow Temperature Profile

| PARAMETER | REFERENCE | SPECIFICATION |
|--------------------------------------|-------------------|-----------------------|
| Average Temp. Gradient in Preheating | | 2.5 Deg.C/s |
| Soak Time | T _{soak} | 2-3 mins |
| Max. Time above 217 Deg.C | T ₁ | 60 s |
| Max. Time above 230 Deg.C | T ₂ | 50 s |
| Max. Time above 245 Deg.C | T ₃ | 10 s |
| Peak Temp in Reflow | T _{peak} | 250 Deg.C [+5.0/-0.0] |
| Max. Temp. Gradient in Cooling | | -5 Deg.C/s |



Product Dimensional Specification



Life Support Policy

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

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) 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.

2. A critical component is any component of a life support device or system 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.



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