PRECISION MICRODRIVES™

Welcome to Precision Microdrives

Vibration motors and haptic feedback engineering

Trust Precision Microdrives to expedite the design and manufacture of miniature vibration motors, mechanisms and haptic feedback technology for your product

For nearly two decades, we have managed our customers' engineering risks on every design. Using our proven technology and design process, we engineer cost-effective, multi-volume motor and mechanism solutions you can rely on. Freeing up your engineering resource to expedite your R&D.

- **Custom assemblies**
- **Engineering confidence**
- **Full testing validation**
- **Mechanism design**
- **Longevity testing**
- **Serialisation compliance audit records**

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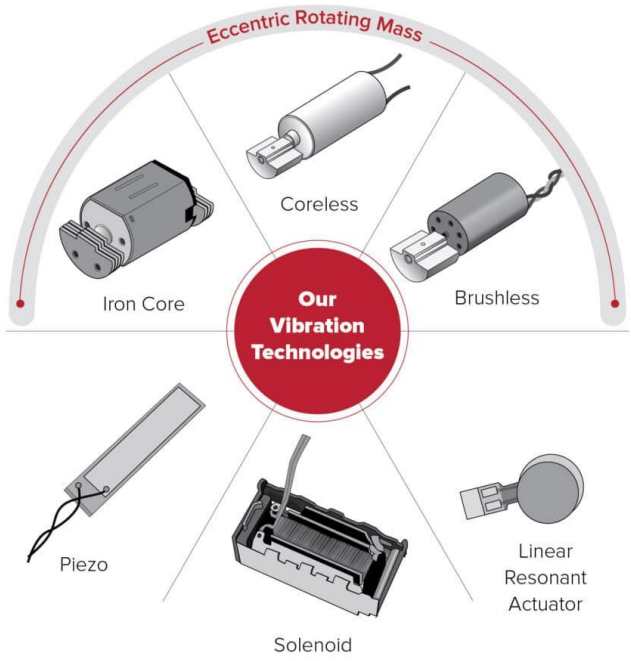
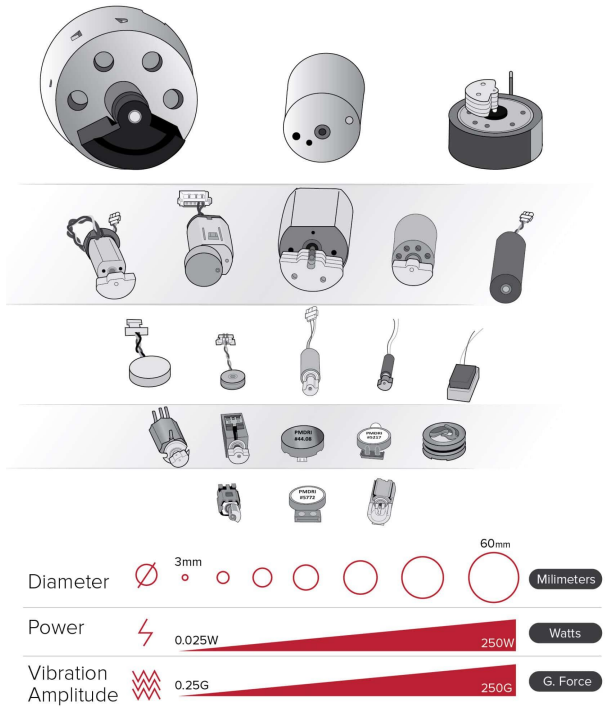
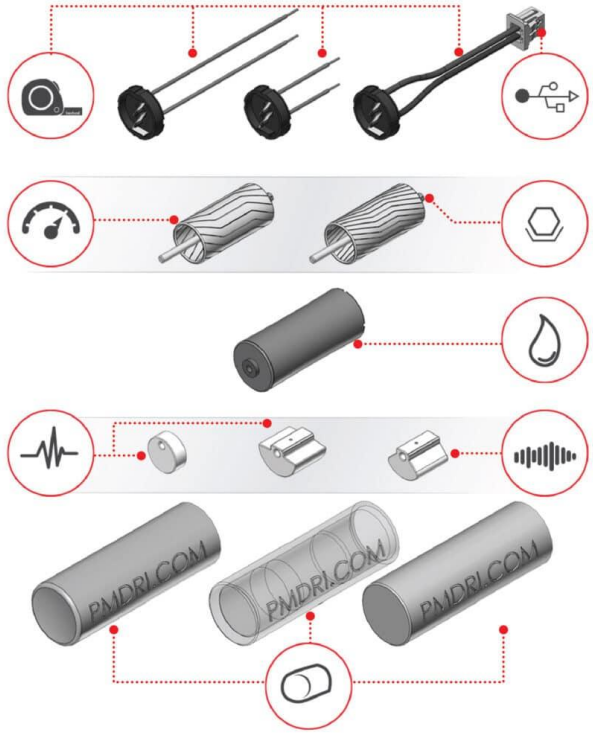
Technologies and form factors







Vibration motor technologies

Our application engineers design vibration and haptic feedback solutions using six distinct motor technologies.

- Eccentric Rotating Mass (ERM)
- Linear resonant actuators
- Solenoid actuators

Typical vibration motor form factors

There are some common form factors and design influences that are commonly used.

- Leaded vibration motors
- Through hole PCB vibration motors
- SMD reflow vibration motors
- Coin and pancake vibration motors
- Encapsulated vibration motors

Customisations

We routinely re-design and customise all types of vibration motors.

- Lead customisation
- Connectors
- Brushes and commutator
- Bearings and lubricants
- Resonant vibration frequencies
- Encapsulation
- Eccentric mass modification
- Winding customisation

Typical motor form factors

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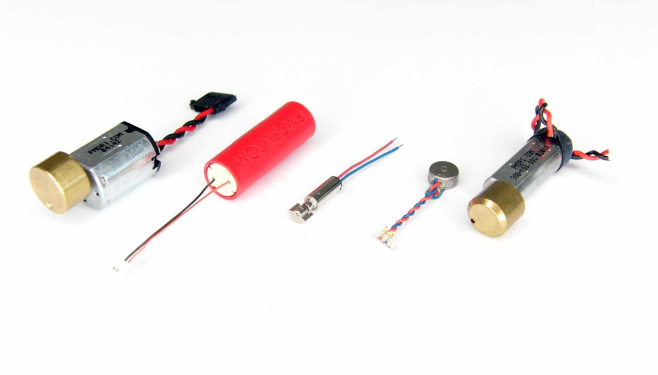


Leaded vibration motors

Most vibration motors come with pre-fitted wires / leads that can be modified to length and fitted with a wide range of connectors.

Through hole PCB

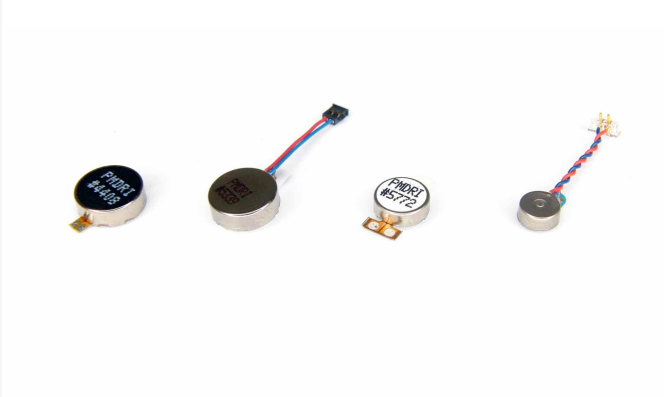
Some vibration motors can be through-hole PCB mounted, and within this category, we can send power through pins or wires / leads

SMD reflow

We offer a wide range of SMD reflowable vibration motors that are supplied on SMD pick and place reels.

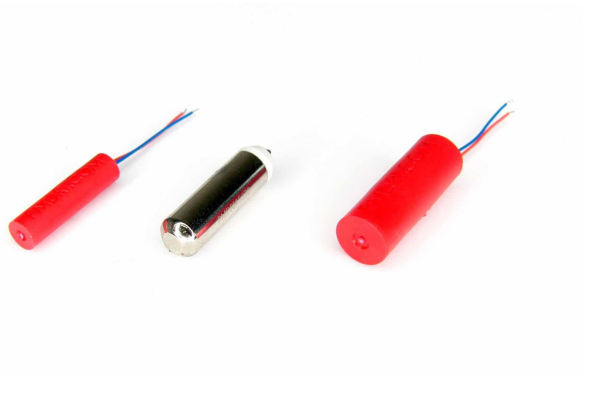
Spring pad

For cases where the motor should be integrated into the case, rather than PCB, spring pad motor designs are a good choice.



Coin and pancake

We carry a wide range of ERM and LRA motors in both coin or 'pancake' designs. These can be leaded or fitted with pad springs.



Encapsulated

If ERM clearance is an issue, or over-moulding is desired, try our range of encapsulated vibration motors.

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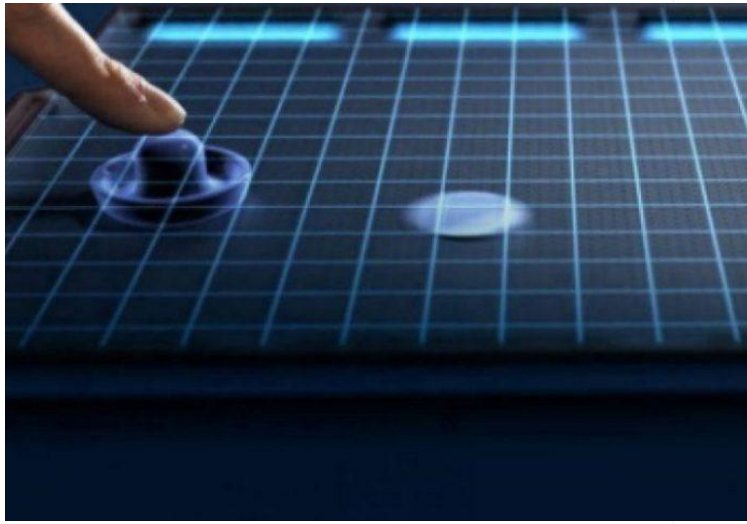
Vibration alerting or Haptic Feedback?

Haptic feedback is a tactile user interface

Haptic feedback uses very controlled vibration or actuated movement, to provide touch feedback or information to a user. It is a tactile user interface and enables a device to speak the 'language' of haptics, adding complexity.

The most obvious implementation of this is a touch screen, where haptic feedback takes the form of simulating the feeling of pressing a button.

A more complex example would be a glove with many haptic actuators on it to support training of a surgeon in a virtual reality environment.



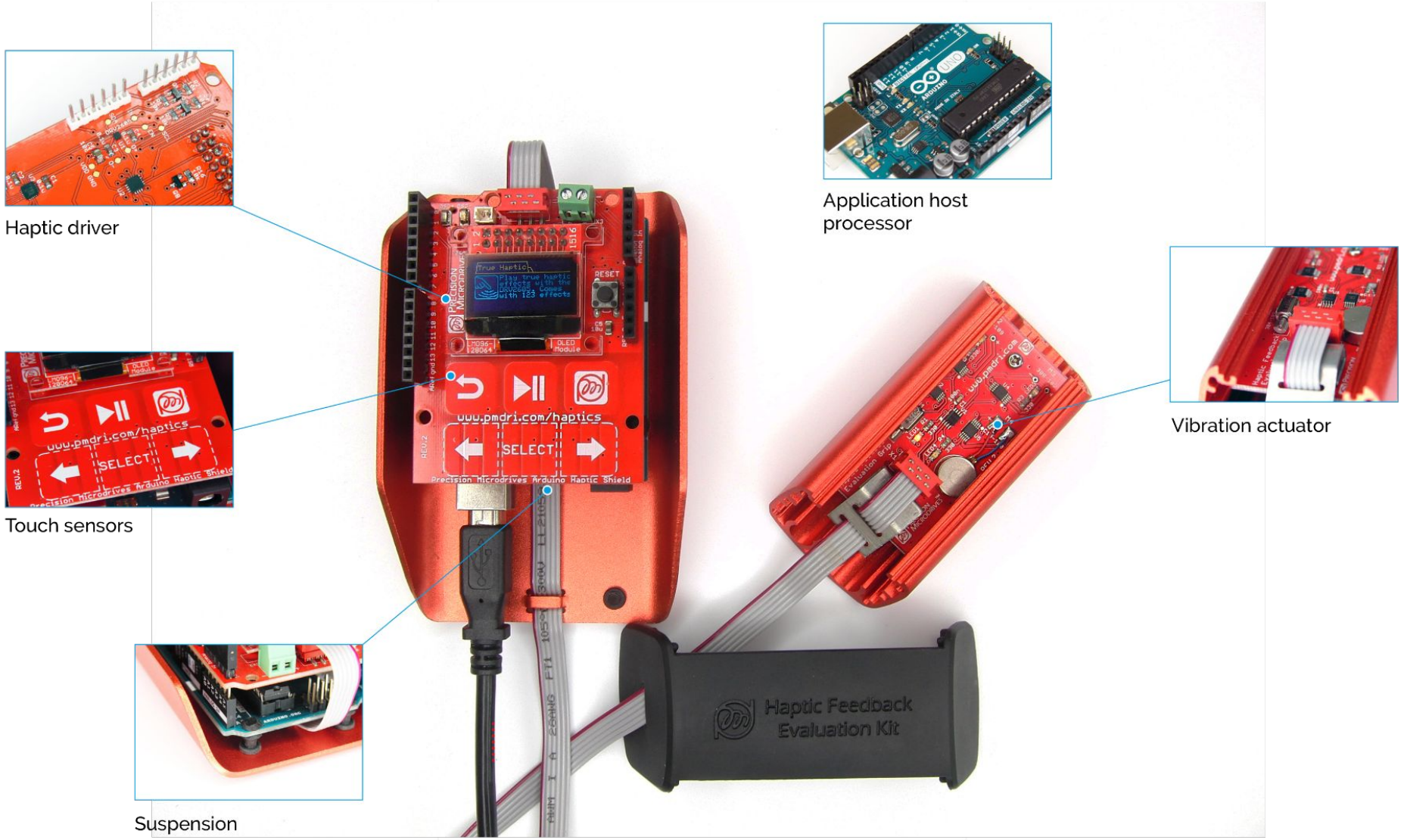
Vibration alerting is a tactile alarm

Vibration alerting is a lot simpler. It's a binary on / off signal to a user to grab their attention. Think of an incoming phone call, vibration on a steering wheel to alert the driver that they have veered across a lane marking, or a vibrating crane control stick to signal that the attached load is too heavy.

Vibration alerting can also be quite elaborate – think of a belt with 12 integrated vibration motors to direct the wearer where to go. Most people call this haptics, but it's actually just vibration alerting.

Why the big deal with semantics? Well in a nutshell, if you're vibration alerting the project is going to be much simpler and cheaper.

The components of haptic feedback



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Vibration motor key markets

Medical

- Point of care machines
- Lab analysis and diagnostics equipment
- Drug dispensers
- Automated test platforms
- Pumps
- Surgically implanted devices

Instruments

- Monitoring and measuring devices
- Lab sample preparation equipment
- Diagnostics equipment
- Sensors and gauge testing
- Bench-top dispensary equipment
- Electronics test equipment

Industrial

- Emergency services equipment
- Analysis and monitoring devices
- Transport and logistics
- Controllers
- Ticket kiosks and ATM's
- Robotics and artificial limbs

Consumer

- Touchscreens and smart devices
- Video games and controllers
- Smart homes
- Automotive dashboards
- E-bikes

Security

- Sensors and alarms
- Handheld scanners
- Surveillance cameras and monitors
- Locks, security systems and safes
- Passport readers and ID scanners

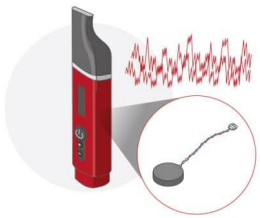
Healthcare

- At home health monitoring
- Rehabilitation accessories
- Fitness trackers and smart watches
- Oral drug dispensaries and vapes
- Stairlift and mobility solutions

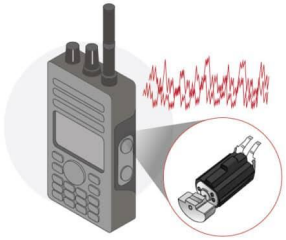
CASE STUDIES

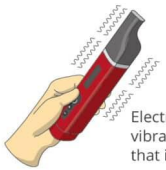
Example vibration motor applications

Vaporiser



Fireman's Radio





Electronic vaporiser vibrates, to indicate that it's ready to vape.

Emergency services radio vibrates, to alert of an incoming call.

Vibration alerting

Vibration alerting is used to interrupt a users attention with a tactile alert. A pager or phone vibrating to indicate an incoming message. A fireman's radio indicating an incoming call.

A respiratory aid indicating that it's filter needs changing, and a pacemaker indicating that its battery needs changing, are all examples of using vibration to augment or replace sound or visual-based indicators or warnings.

JCB Control Sticks

Simple haptic effects using highly durable vibration motors, indicate dangers to operators.

Steering Wheel

Haptic effects, such as pulsation frequency, can warn the driver of veering lane.

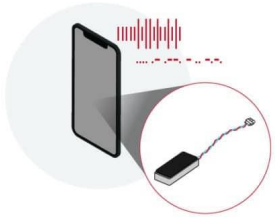
Haptics for user interfaces

Precision Microdrives vibration motors can also be used to add haptics to non-screen user interfaces.

This is a more refined version of Vibration Alerting, where more information than just an alert needs to be conveyed to the user.

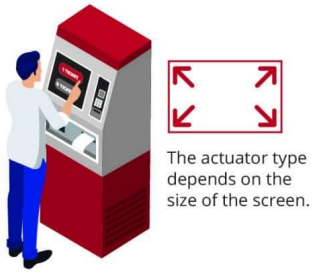
Many items can be turned into haptic user interfaces, for example, shoes that vibrate directions to one foot at a crossroads, or steering wheels that vibrate as part of a lane departure warning system.

Mobile Phone



Ticket Machine

High Definition haptic effects provide feedback, when user interface buttons are pressed.



The actuator type depends on the size of the screen.

Touch screen haptics

Screen haptics is where a vibration motor is used to simulate the tactility of a push-button when a user presses a flat screen.

We have a wide range of vibration motors and Linear Resonant Actuators optimised for screen haptics applications.

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Our capabilities

We can support you through the whole journey from prototype to high volume cost-effective mass production:

Motor & mechanism design

Designing motors and mechanisms for a wide range of industrial, medical, and consumer applications.

Flexible mechanism manufacturing

Our manufacturing lines are flexible. We support high volume and high value-add builds.

Quality control and after sales support

Delivering industry leading consistency and support through your product life-cycle.

Expert motor testing & validation

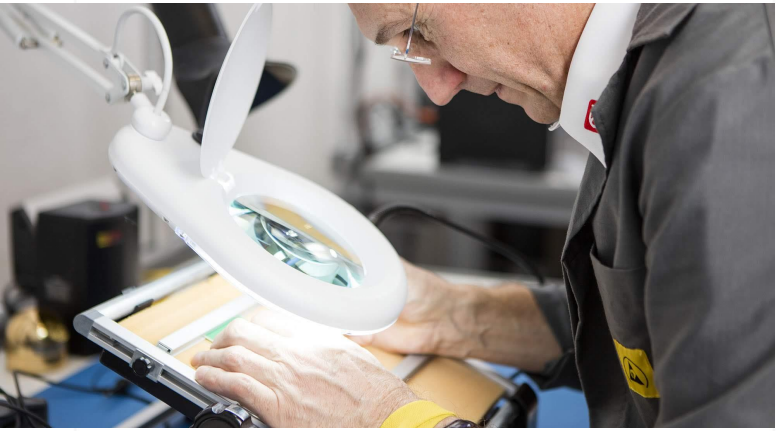
In house designed dynamometers are used to validate motors, and we design line-end equipment to test each mechanism made.

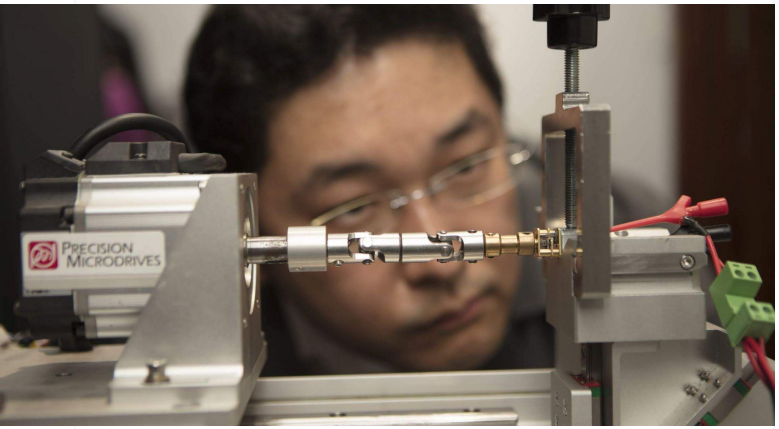
Delivering on time & to spec

Delivering a solution to your requirements, on time and to specification.

Managing your risk

We use our proven technology to solve your motor problems, reducing costs and managing your risk through optimised design.





Trust Precision Microdrives to manage your development and manufacturing risks

You need our support. We're here to help.

Motor products are difficult to understand, specify, validate and integrate into end application. The industry has no standards and suppliers typically offer only fragments of advice.

We know what you don't, and can mitigate your motor design, manufacturing and supply risks.

Get in touch with our team today, or visit our website for more information.

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