



DISCOVERY TECHNOLOGY INTERNATIONAL

INSTRUCTION MANUAL

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Rotary Bidirectional Piezoelectric Motor Evaluation Kit

(Model #'s: PM-1124R-HS, PM-1124R-SS)



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PM-1124R OEM Evaluation Kit Instruction Manual

1.0 Introduction

The PM-1124R rotary piezo motor represents a quantum leap in design of small size high-performance DC motors. Injection-molded using extremely durable, but light weight engineered reinforced thermoplastics, the PM-1124R provides low cost with superior precision and ultrafast response/start-stop characteristics. Highly energy efficient, the PM-1124R consumes zero power in hold position while still providing significant torque. Available in a variety of configurations (including non-magnetic) the PM-1124R is the ideal choice for high volume demanding OEM applications where superior performance and economical unit cost are important factors.

The contents of this kit are intended to be used as an evaluation tool for engineers interested in learning more about the performance and operation of DTI's PM-1124R-HS/PM-1124R-SS piezoelectric motors (piezo motors). The PM-1124R is a technically advanced piezo motor available in two design configurations. Model PM-1124R-HS is designed with a hollow shaft and Model PM-1124R is designed with a traditional motor shaft. The PM-1124 combines high performance and excellent quality with an affordable low cost. The main body of the piezo motor is molded using modern reinforced engineered thermoplastics and is aimed at OEM applications.

The electronic driver PCB for the piezo motor is included in the kit, together with cables and a 12 DC power supply.

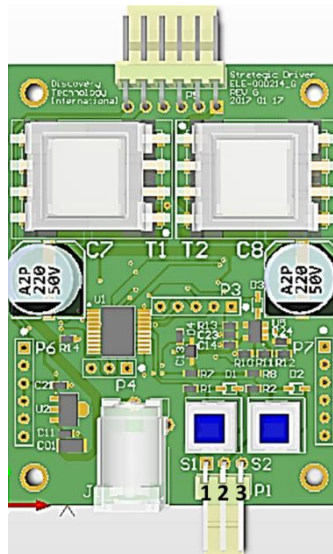


Figure 1. Electronic PCB driver

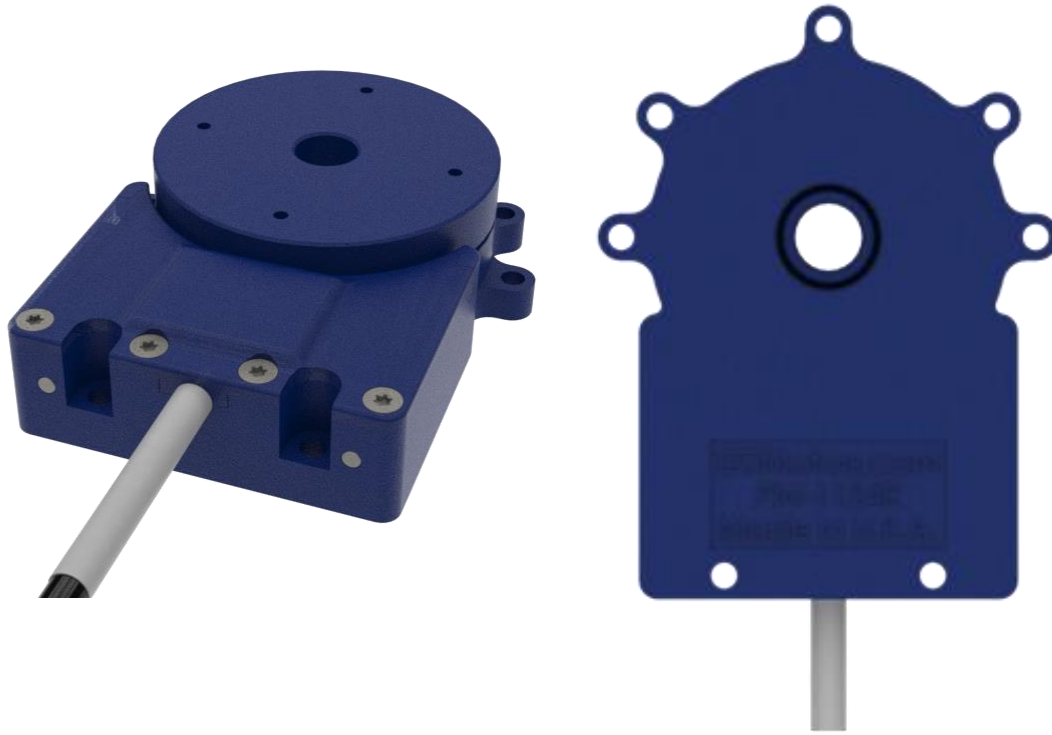


Figure 2. PM-1124R-HS (hollow shaft, front & rear)

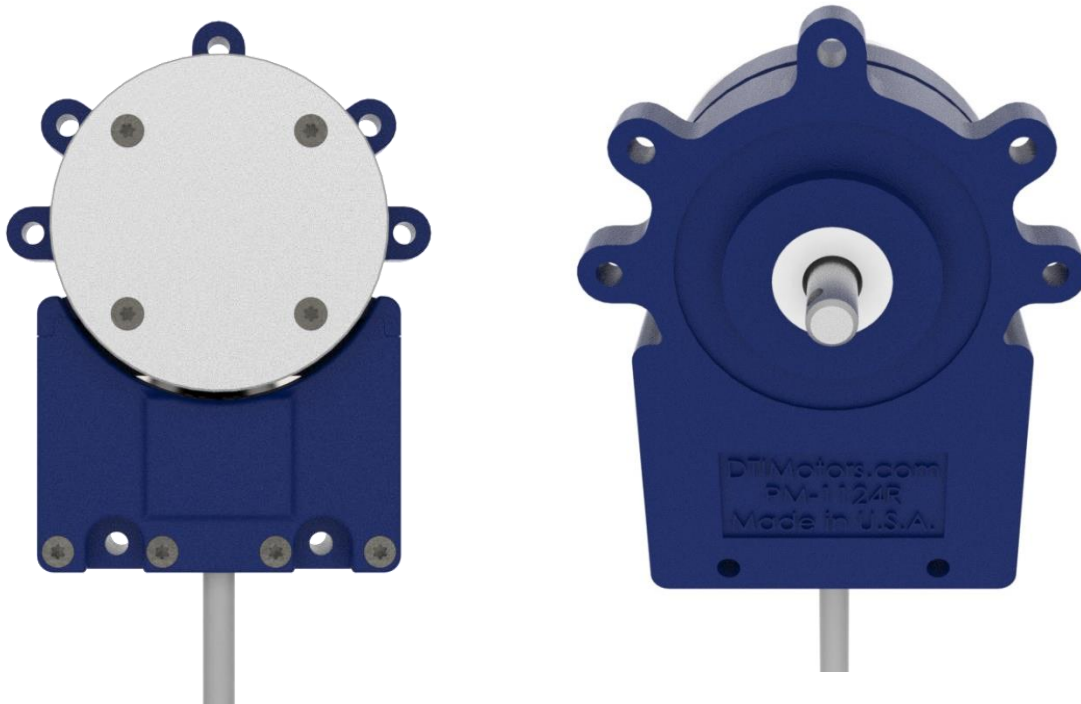


Figure 3. Model PM-1124R-SS (regular shaft, front & rear)

2.0 Properties

Some of the unique properties of the PM-1124R include:

- Modern reinforced engineered thermoplastic design provides reliability and low cost
- Superior precision and resolution
- Ultra-Fast response time with superior start-stop characteristics
- High torque for size
- Designed for direct drive applications
- Stepping and Continuous mode of operation
- Six orders of magnitude speed dynamic range
- When not energized, the motor serves as a brake and consumes zero power
- Silent operation in continuous mode
- Low voltage and decreased possibility for electrical arcing

3.0 Unpacking and Preparation

After unpacking the PM-1124R evaluation kit, the items should be checked against the Parts List shown in Table 1. If any items are missing contact DTI immediately for replacement parts.

DESCRIPTION	Part No.
Piezo motor Model PM-1124R-HS (hollow shaft) or PM-1124R-SS (regular metal shaft)	C25-4RHS-EK or C25-4RSS-EK
Electronic Driver PCB	Included
Interconnect cables	Included
Power Supply (12V DC)	Included

Table 1 – Parts List

4.0 Technical Specifications

The following technical specification are provided with the PM-1124R.

Motor model	PM-1124R-HS/SS
Mode of operation	Continuous/Stepping
Max angular speed	≤100 rpm
Max operating torque	≥30 mN.m
Holding torque	≥40 (mN.m)
Angular resolution	≤10 arc-sec
Dynamic range	4 kHz
Supply voltage	12 VDC
Operating Current	350 mA*
Motor weight	20 g
Operating Temperature	-20°C to + 80°C
Dimensions, length x width x height	62x42x18 (mm)

*Customizable to as low as 100 mA (contact DTI for information).

Table 2 – PM-1124R Specifications

4.1 Schematic Drawings

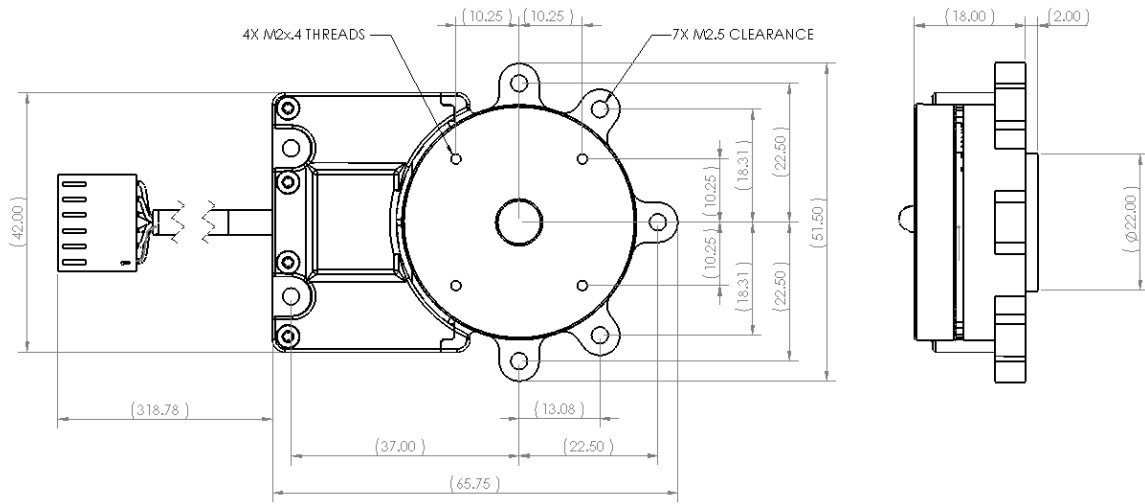


Figure 4 – Schematic drawing (mm) of Model # PM-1124R-HS

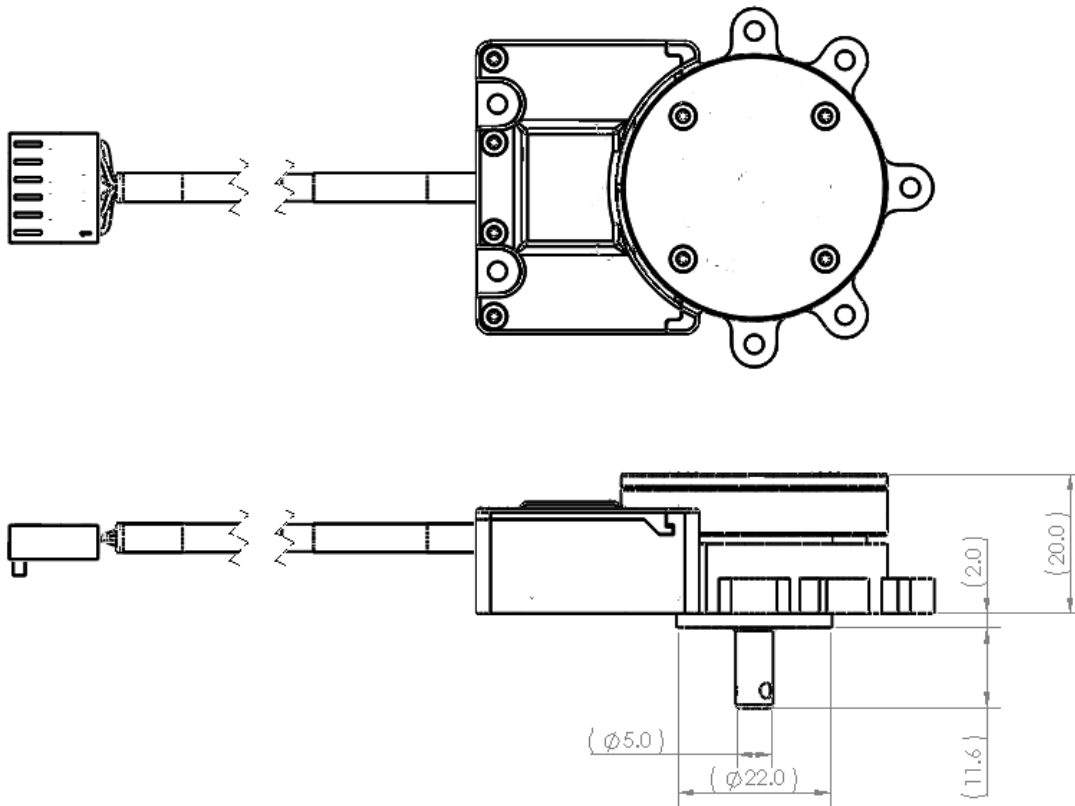


Figure 5 – Schematic drawing (mm) of Model # PM-1124R-SS

5.0 Operation and Control of the Piezo motor

5.1 Connecting the Power Supply

Connect the 12V Power Supply to the Power Supply Connector located on the electronic driver PCB (Figure 1). Connect the other end of the 12V Power Supply to an appropriate wall power socket.

5.2 Connecting the Driver Board

The piezo motor connects to the driver board by a connector on the end of the motor wire. This connector mates with the corresponding connector on the electronic driver PCB. The connectors can only be joined in one possible orientation. Press the connector gently in place so that it is flush with the edges of the receptacle on the driver PCB.

5.3 Operation of the Motor and Driver Board

The electronic driver PCB generates the drive signals required by the piezo motor. Motion is created causing the rotor to rotate. The design enables travel in both directions. Manual control of rotation is achieved by pushing alternatively the two buttons on the driver board.

5.4 External Control

The driver board can be controlled using an external signal source. Control signals are applied to Pin **1** or Pin **2** on the External Signal Connector (**1,2,3**) Fig. 1; depending on the desired direction of travel. Pin **3** is the common wire. The unused wire must be held at TTL high or be left open. The control signals applied to Pins **1** or **2** must be TTL compatible. A “high” level (1.8 to 12 Volts) disables travel, a ‘low’ level (0 to 0.8 Volts) enables travel.

5.5 Stepping and Continuous Modes

The mode of travel, stepping or continuous, depends on the type of signal applied to the External Signal Connector (**1,2,3**) Fig. 1. A constant “low” level (D.C.) signal will result in continuous motion at maximum speed. A pulse or pulse train will result in stepping operation.

In the stepping mode (PWM mode), the size of each step is determined by the pulse duration, and the speed of travel is determined by the pulse repetition rate. The minimum pulse duration is around 30 microseconds. The maximum repetition rate F , measured in Hertz, for a selected pulse duration T , measured in seconds, is determined by the formula $F = 1/T$.

Warning Note: Using PM-1124R in Continuous Mode

The PM-1124R piezo motor is capable of high force and fast reaction, but it is designed for short duration start /stop applications. Although the motor could be run continuously in continuous mode, prolonged operation in continuous mode can lead to overheating in the motor (unless cooled) and possible internal damage. This restriction does not apply when using the PM-1124R in Stepping Mode. For applications requiring prolonged operation of continuous mode, please contact DTI's Technical Support.

6.0 Technical Support

Technical support is available from 9 AM to 5.30 PM U.S. Eastern Time. Please refer to contact information at end of manual.

7.0 Warranty

DTI products are produced to state of the art production methods and are subject to strict quality control. All sales and deliveries are made exclusively on the basis of our general Terms and Conditions of Business. These are available to view and download on the DTI homepage at <http://www.dtimotors.com/terms-and-conditions/>

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