

## ▼ CHAPTERS

Manual Stages

Motorized Stages

Multi-Axis  
Platforms

Actuators

Controllers

## ▼ SECTIONS

Linear Translation

Microscopy Stages

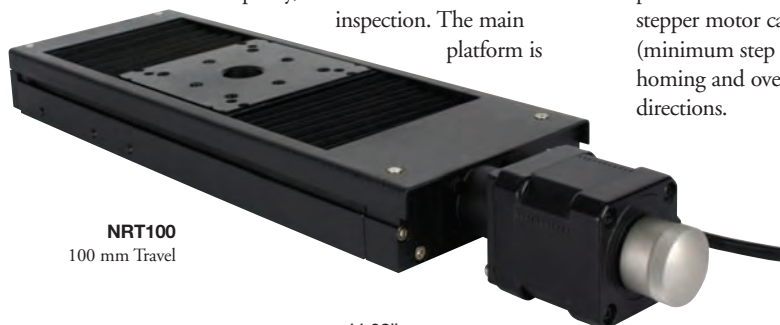
Rotation

Goniometers

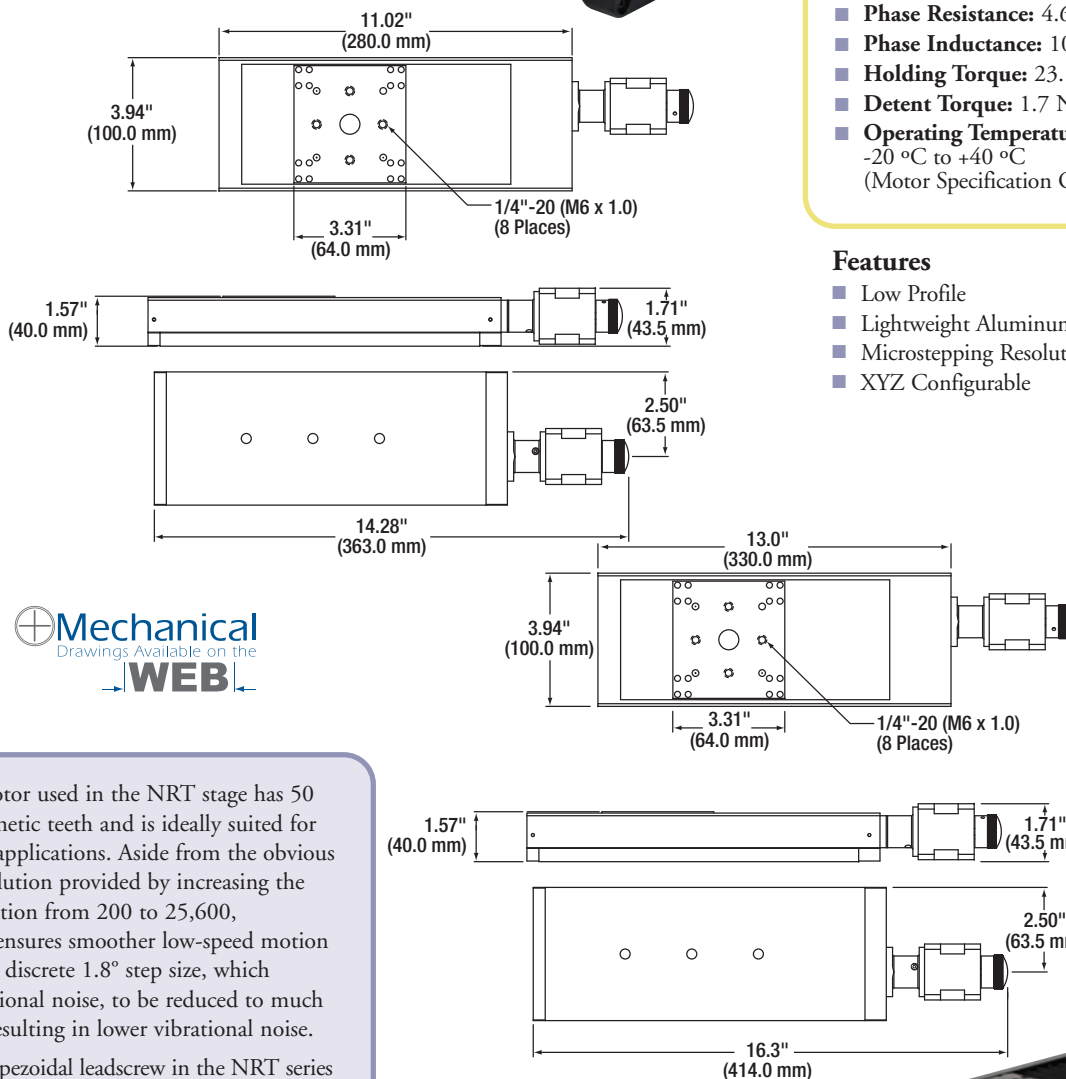
## 100 mm and 150 mm Travel: NRT Series (Page 1 of 2)

The NRT series of positioning stages are ideally suited for applications that require long travel, high precision, and high-load capacity, such as measurement and inspection. The main platform is

supported by four recirculating ball carrier bearings mounted to precisely aligned linear guide rails. A minimal backlash leadscrew produces smooth translation. It is directly driven with a two-phase stepper motor capable of 25,600 microsteps per revolution (minimum step size of 100 nm). Magnetic limit switches allow homing and overdriving protection in both forward and reverse directions.



**NRT100**  
100 mm Travel



 **Mechanical**  
Drawings Available on the  
**WEB**

## Mechanical and Electrical Data

## Stepper Motor-Based Actuator

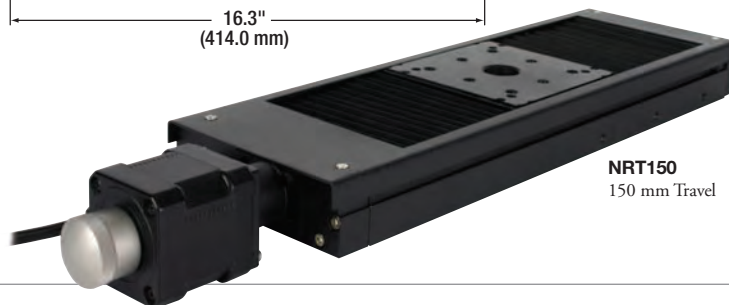
- **Step Angle:** 1.8° (50 Poles and  $\pm 2$  Phases for 360° Divided by 200)
- **Step Accuracy:** 5%
- **Rated Phase Current:** 1 A
- **Phase Resistance:** 4.6  $\Omega$
- **Phase Inductance:** 10.6 mH
- **Holding Torque:** 23.1 N·cm
- **Detent Torque:** 1.7 N·cm
- **Operating Temperature:** -20 °C to +40 °C (Motor Specification Only)

## Features

- Low Profile
- Lightweight Aluminum Body
- Microstepping Resolution
- XYZ Configurable

The stepper motor used in the NRT stage has 50 individual magnetic teeth and is ideally suited for microstepping applications. Aside from the obvious increase in resolution provided by increasing the steps per revolution from 200 to 25,600, microstepping ensures smoother low-speed motion by allowing the discrete 1.8° step size, which produces vibrational noise, to be reduced to much smaller steps, resulting in lower vibrational noise.

The use of a trapezoidal leadscrew in the NRT series also provides a number of benefits over the more common Acme-style thread. The benefits include improved durability, lower friction due to improved surface quality, and very little backdrive, which eliminates the need for a braking mechanism commonly required with ball screws.



**NRT150**  
150 mm Travel

## 100 mm and 150 mm Travel: NRT Series (Page 2 of 2)

### Specifications

- **Travel Range**
  - NRT100: 100 mm (3.94")
  - NRT150: 150 mm (5.91")
- **Recommended Controller:** BSC101 (See Page 632)
- **Max Velocity:** 10 mm/s
- **Stage Bearing Construction:**  
Aluminum Recirculating Ball Bearing
- **Bidirectional Repeatability:** 1  $\mu$ m
- **Backlash:** <3  $\mu$ m
- **Min Achievable Incremental Movement:** 100 nm
- **Max On-Axis Load Capacity (Vertical):**  
11 lbs (5 kg)
- **Max On-Axis Load Capacity (Horizontal):**  
44 lbs (20 kg)
- **Absolute On-Axis Accuracy**
  - NRT100: 16  $\mu$ m
  - NRT150: 20  $\mu$ m
- **Calibrated Accuracy:** 2  $\mu$ m
- **Max Percentage Accuracy:** 0.09%
- **Home Location Accuracy:**  $\pm 0.6$   $\mu$ m
- **Pitch:** 0.008°
- **Yaw:** 0.05°
- **Weight**
  - NRT100: 4.85 lbs (2.2 kg)
  - NRT150: 5.5 lbs (2.5 kg)



NRT100 and NRT150  
Stages Stacked in an XYZ  
Configuration



NRT150P1

The NRT series of stages are compact, making it possible to set up experiments in locations where space is minimal. Two stages can be directly stacked into an XY configuration or, with the use of the NRT150P1 vertical mounting bracket, three stages can be mounted into an XYZ configuration as pictured to the left. Alternatively, the NRT150P1 can be directly attached to an optical table for applications that require one axis of vertical translation. These various configurations are easily achieved using the assortment of mounting screws that are shipped with the NRT150P1.

ITEM #	METRIC ITEM #	\$	£	€	RMB	DESCRIPTION
NRT100	NRT100/M	\$ 1,940.00	£ 1,396.80	€ 1,687.80	¥ 15,461.80	100 mm Travel Motorized Linear Stage
NRT150	NRT150/M	\$ 2,145.00	£ 1,544.40	€ 1,866.15	¥ 17,095.65	150 mm Travel Motorized Linear Stage
NRT150P1	NRT150P1/M	\$ 142.00	£ 102.24	€ 123.54	¥ 1,131.74	Vertical Mounting Bracket For NRT Series Stages

## Have you seen our...

## apt™ System: Multi-Channel Stepper Motor Controller



BSC103  
3-Channel Stepper Motor Controller



The BSC103 benchtop 3-axis stepper motor controller combines high-speed digital signal processor, low-noise analog electronics, and ActiveX® software technology to provide effortless one- or three-axis control. Additional axes can be controlled by connecting one or more benchtop units via a standard USB hub.

*For more details, see pages 632 - 633*