

KRD201/301/311

Non-standard mass and center of gravity, moment of inertia tester

Model Airplane Application

The model airplane flight needs good maneuverability and maneuverability. In the design, the position of the pressure center and the position of the center of mass should be required, and the maneuverability margin and stability of the model aircraft should be calculated, and the position of the center of mass in three directions should be measured. Determine and measure the moment of inertia in three directions (pitch, yaw and roll), which can be used to calculate the control force of attitude adjustment.



Mass and center of gravity
tester for model airplane



Moment of inertia tester
for model airplane

Main technical specifications

It's required to measure the position of center of gravity of micro-craft in the X, Y and Z directions and the moment of inertia around the X, Y and Z axes. The maximum size of measured micro-craft is: wingspan 5.0m, height 1.0m, length 3.0m.

- ◆ Mass measurement range: 500g~25kg
- ◆ Mass testing accuracy: $\leq \pm 6g$
- ◆ Center of gravity measurement accuracy: $\leq \pm 1mm$ in the range of 5~25kg;
 $\leq \pm 2mm$ in the range of 500g~5kg
- ◆ Rotational inertia measurement range: $0.1kg \cdot m^2 \sim 10.0kg \cdot m^2$
- ◆ Rotational inertia accuracy: $\leq \pm 1\%$

Satellite Momentum Wheel Application



Moment of inertia tester for satellite momentum wheel



Mass and center of gravity of inertia tester for satellite momentum wheel

Main technical specifications

- ◆ Mass measurement range: 2kg~10kg
- ◆ Main test workpiece: momentum wheel axial mass and cable box X, Y, Z direction mass position.
- ◆ Mass and center of gravity measuring table size: 400mm× 400mm
- ◆ Mass measurement accuracy: $<\pm 0.08\%$.
- ◆ Center of gravity measurement accuracy: $<\pm 0.1\text{mm}$.
- ◆ Rotational inertia measurement range: $100\text{kg}\cdot\text{cm}^2 \sim 4000\text{kg}\cdot\text{cm}^2$
- ◆ Clampable diameter range of the specimen must meets the requirments of the specimen's clamping diameter.
- ◆ Max. clamping outside diameter of the specimen must meets the requirments for the specimen's outline size.
- ◆ Rotational inertia measurement accuracy : $\pm 0.3\%$ ($\pm 0.5\%$ when less than $500\text{kg}\cdot\text{cm}^2$)

INS (Inertial Navigation System) Application



Mass and center of gravity tester for inertia navigation system

Main technical specifications

- ◆ Mass measurement range: 2kg~10kg;
- ◆ Mass measurement accuracy: $\pm 3\text{g}$;
- ◆ Center of gravity measurement accuracy
- ◆ in X direction: $\pm 0.2\text{mm}$;
- ◆ Center of gravity measurement accuracy in Y、 Z directions: $\pm 0.1\text{mm}$.



Mass and center of gravity tester for seeker

Seeker Application

Main technical specifications

- ◆ Mass measurement range: 2kg~10kg;
- ◆ Mass measurement accuracy: $\pm 3g$;
- ◆ Center of gravity measurement accuracy in X direction: $\pm 0.15mm$;
- ◆ Center of gravity measurement accuracy in Y、Z directions: $\pm 0.05mm$.

Main features

- ◆ All stainless-steel parts to be used above the table top to prevent the equipment from rusting.
- ◆ The inner measurement unit processed by vibration absorption meets the requirement for transportation by vehicle.
- ◆ The box for transferring that goes with the system is used for long-distance transportation at any time.

Stable Targeting System Application



Mass and center of gravity tester for stable targeting system



Moment of inertia tester for stable targeting system

Main technical specifications

- 1) Measuring diameter range: $\varphi 15 \sim \varphi 50$;
- 2) Mass measurement range: 5~20kg;
- 3) Rotational inertia measurement range: $100kg \cdot cm^2 \sim 3000kg \cdot cm^2$;
- 4) Rotational inertia measurement accuracy: $\leq \pm 0.5\%$ (With all ranges)
- 5) Mass measurement accuracy: $\pm 5g$;
- 6) Center of gravity measurement accuracy: $\pm 0.03mm$ for rotating body, $\pm 0.1mm$ for non-rotating body.

Micro Bullet Application



Mass and center of gravity
tester for micro bullet

◆ Mass and center of gravity tester for micro bullet

Main technical specifications

- ◆ Mass measurement range: 50g ~ 1.5kg;
- ◆ Mass measurement accuracy: $\leq \pm 0.5g$;
- ◆ Center of gravity measurement accuracy: axial $\leq \pm 0.2mm$, radial $\leq \pm 0.05mm$;
- ◆ Total weight: < 5kg;
- ◆ Table size: length $\leq 200mm$, width $\leq 120mm$;
- ◆ Clamping outer diameter of the specimen: $\Phi 20 \sim \Phi 50mm$;
- ◆ Clamping distance of the specimen: $\leq 200mm$;
- ◆ Manual lifting device is equipped.

◆ Moment of inertia tester for micro bullet



Moment of inertia
tester for micro bullet 1

Tester 1 Main technical specifications

- ◆ Rotational inertia range: 10g·cm² to 1kg·cm²;
- ◆ Rotational inertia measurement accuracy: $\pm 1\%$;
- ◆ Total weight: < 2kg;
- ◆ Size: base diameter $\Phi 100mm$, height 200mm;
- ◆ Clamping outer diameter of the specimen: $\Phi 10 \sim \Phi 30mm$;
- ◆ Clamping distance of the specimen: $\leq 150mm$.



Moment of inertia
tester for micro bullet 2

Tester 2 Main technical specifications

- ◆ Rotational inertia range: 1kg·cm² ~ 100kg·cm²;
- ◆ Rotational inertia measurement accuracy: $\pm 1\%$;
- ◆ Total weight: < 5kg;
- ◆ Size: base diameter $\Phi 200mm$, height 300mm;
- ◆ Clamping outer diameter of the specimen: $\Phi 30 \sim \Phi 70mm$;
- ◆ Clamping distance of the specimen: $\leq 250mm$.

Inertia Tester Application

For asymmetric structures, the inertia product of the object can be measured by using the torsional pendulum method of measuring the moment of inertia.

Measuring method

Measure all six inertia tensors: I_x , I_y , I_z , I_{xy} , I_{xz} , I_{yz} .

For the rotational inertia tester, the fixture is horizontally installed when I_y , I_z , and I_{yz} are measured, the fixture is installed at a 45° when I_{xy} and I_{xz} are measured, and the fixture is installed vertically.

There are 3 kinds of no-load situations, so it is necessary to measure the tensor under 3 kinds of no-load conditions and 6 kinds of load conditions, therefore, the measured tensors are I_y under no load, I_x under no load, I_{xy} under no load, I_y under load, I_z under load, I_{yz} under load, I_{xz} under load, I_{xy} under load, and I_x under load.



Inertia tester



Main technical specifications

- ◆ Rotational inertia range: $0.05 \text{ kg}\cdot\text{m}^2 \sim 0.5 \text{ kg}\cdot\text{m}^2$;
- ◆ Measurement accuracy of rotational inertia: $\pm 0.3\%$;
- ◆ Inertia product measurement accuracy of: $\pm 1\%$;
- ◆ Principle axis of inertia measurement accuracy: ± 20 ;
- ◆ Output parameters:
 - 6 central inertial tensors;
 - 9 direction cosines to determine where 3 principle axes of inertia are;
 - 3 principal moments of inertia.