MP6500

Weight, Center of Gravity, and Moment of Inertia Measurement Instrument

Measurement Concept

Weight and Center of Gravity Measurement:
These instruments use the multi-point weighing method to simultaneously measure both weight and CG. Less than one minute is required to make a measurement, so these instruments are ideally suited to high volume production. This type of instrument is best suited for measuring a limited number of specific test items. For high accuracy CG measurement, we recommend our KSR series instruments.

The object is lowered onto the interface plate and positioned relative to the machine reference axis (fixturing may be required). The computer that reads the force transducers and performs the necessary algebraic calculations then determines the center of gravity location and weight of the object. Weight is calculated by summing the output of the force transducers. CG is calculated using an equation involving the spacing of the transducers, and the distribution of force. For example, if all of the weight of the test item is applied to a single transducer, then the CG of the test item is directly above that transducer. The third CG coordinate may be measured after rolling the object 90°.

MOI Measurement:
The instrument uses a flat gas thrust bearing to support the test part weight, a cylindrical bearing for precise centering, and a torsion rod as a rotational spring. To measure MOI, the test table is manually rotated through a small angle and held against a fixed stop. When released, the table will oscillate freely since the load is supported and centered by a nearly frictionless gas bearing. A digital timer determines the period of oscillation. This procedure is first carried out with the bare table and any necessary locating fixture, and then again with the test part mounted. A simple computation using the tare period, the period with test part, and a calibration constant, converts this data into moment of inertia of the test part.

Computer Operation

A Windows based computer system is provided with the MP6500 system. The MP6500 operating software prompts the user through the testing sequence, acquires output data, calculates results and generates a report. There is a provision for keying in the description or serial number of the object under test, so that the data report can be used to document a series of tests on different objects.

Gas supply

A source of pressurized nitrogen or dry clean air capable of delivering 2 CFM at 70 psi must be provided for the operation of the gas bearing. For locations that do not have a permanent nitrogen line or oil-less dry airline, this gas can be supplied from a Space Electronics Instrument Air Supply. (Shop air usually contains oil and water and is not acceptable.)

General Specifications

Maximum Payload Weight	6,500 lb
Recommended Payload Weight Range	200 – 6,500 lb
MOI Measurement Accuracy	± (0.25% + 2.5 lb-in^2)
CG Measurement Accuracy	± 0.1 in @ 6,500 lb
Weight Measurement Accuracy	± 10 lb
Maximum CG offset from machine reference	4 in
Maximum CG Height	6,000 lb @ 78 in
Interface Plate Outside Diameter	26 in

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