

# PRODUCT DATA

## Force Transducer/Impact Hammer — Type 8203

Force Transducer/Impact Hammer Type 8203 is a unique structural testing kit designed for use with lightweight and delicate structures. The force transducer measures the force applied to the structure. It can be connected to the hammer kit for impact testing or to a small exciter (e.g., Brüel & Kjær Type 4810) via the stinger kit provided.

### USES

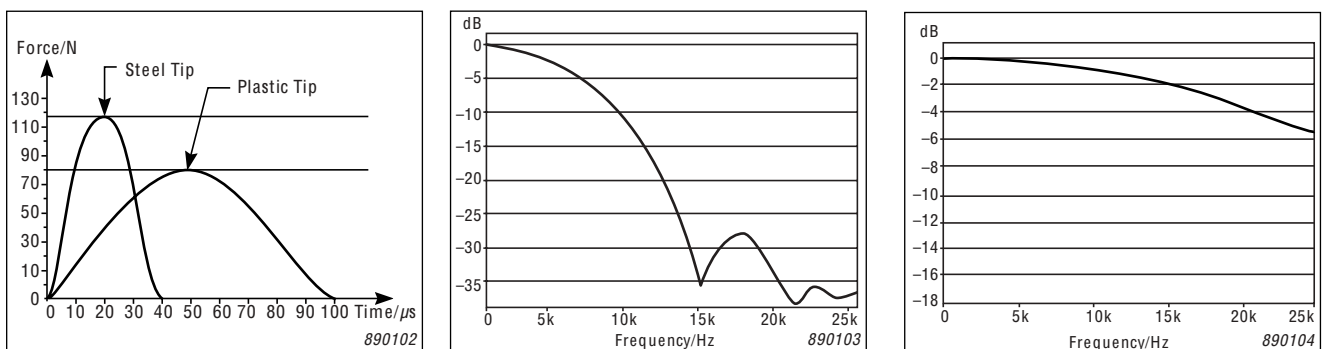
- Dynamic and impact-force measurements on small structures
- Measurement of frequency response functions using both impact and continuous excitation techniques
- As part of a dynamic structural testing system for modal analysis and the prediction of structural response

### FEATURES

- Compact size and low weight allied with an all-welded, robust construction
- Good linearity
- Excellent, long-term stability due to artificial aging
- Individually calibrated and easily mounted
- Easily attached to the stinger and hammer kits
- Negligible changes to dynamic properties of test structure
- Comes with all necessary accessories for every type of mounting
- Titanium tip seating to minimise lateral deformation of tip material during impact
- Aluminium shaft to reduce occurrence of double impact
- Charge mode (PE) output



**Fig. 1** Impulse shapes for the two hammer tips showing the plastic tip with the broadest pulse and lowest peak value (left); Force spectrum of an impact on an aluminium plate using the plastic tip (centre) and the steel tip (right)



### Force Transducer

The piezoelectric force transducer is designed to measure dynamic and impact forces. It is pre-loaded to precisely 1000 N, allowing compressive force measurements of up to

1000 N and tensile force measurements of up to 250 N. The transducer is mounted on the test structure so that the force to be measured is transmitted through the transducer. When used with an exciter, the transducer signal can be used to measure and control the applied force. The

8203

frequency response function of the test structure can be measured by using a dual-channel analyzer. The force transducer is used to measure the input force and an ac-

celerometer (or laser velocity transducer) is used to measure the response of the structure.

## Specifications – Force Transducer/Impact Hammer Type 8203

### Force Transducer

#### Force Range:

- 250 N tensile to 1000 N compressive with pre-loading nuts
- 1250 N compressive without pre-loading nuts

**Linearity Error:** <1% of maximum force

**Charge Sensitivity\* (typical):** 3.6 pC/N with pre-loading nuts

**Capacitance (typical):** 9 pF

**Leakage Resistance (at 25°C):** <10<sup>5</sup> MΩ

#### Stiffness:

- 1 × 10<sup>8</sup> N/m with pre-loading nuts
- 2 × 10<sup>8</sup> N/m without pre-loading nuts

#### Deformation of the Transducer at Maximum Force:

- 10 μm with pre-loading nuts
- 5 μm without pre-loading nuts

#### Resonance Frequency with 5 gram Load Mounted on Top (typical):

- 21 kHz with pre-loading nuts
- 30 kHz without pre-loading nuts

#### EFFECTIVE SEISMIC MASS

##### Above Piezoelectric Element (top):

- 1.1 g with pre-loading nuts
- 1.2 g without pre-loading nuts

##### Below Piezoelectric Element (base):

- 2.1 g with pre-loading nuts
- 0.4 g without pre-loading nuts

**Temperature Range:** -196°C to 150°C

**Temperature Transient Sensitivity (typical):** 0.6 N/°C

**Transverse Sensitivity (typical):** 7%

**Bending Moment Sensitivity (typical):** 100 pC/Nm

**Maximum Bending Moment for Stated Bending Moment Sensitivity:** 0.5 mN

\*Individual values are given on the calibration chart

## Ordering Information

### Accessories Included

AO 0339	Cable
DB 3041	Steel Tip
UC 0205	Plastic Tip
YS 9202	Tip Mounting Screw
UC 5322	Pre-loading Nut (M3 Thread, M2 Screw)
YM 0249	Pre-loading Nut (M3 and M2 Thread)
DB 1425	M3/10–32 UNS Adaptor
YQ 2004	M3 Screw for DB1425
QA 0041	Tap for M3 Thread
2 × QA 0186	5 mm Spanner
QA 0042	Allen Key

#### Trademarks

DeltaTron is a registered trademark of Brüel & Kjær Sound and Vibration Measurement A/S

Brüel & Kjær reserves the right to change specifications and accessories without notice

**Strain Sensitivity (top and base):** <0.002 N/μstrain with pre-loading nuts

**Magnetic Sensitivity at 50 Hz (typical):** 0.1 N/T

**Material:** Titanium and steel

#### Weight:

- 3.2 g with pre-loading nuts
- 1.6 g without pre-loading nuts

#### DIMENSIONS

**Diameter:** 9.0 mm

#### Height:

- 15.8 mm with pre-loading nuts
- 7 mm without pre-loading nuts

### Hammer

**Handle Material:** Anodised Aluminium

**Transducer Sealing:** Rubber

#### WEIGHT

**Plastic Tip:** 0.3 g

**Steel Tip:** 0.3 g

**Impact Duration (on a heavy steel target)**

**Plastic Tip:** 100 μs


**Steel Tip:** 30 μs

**Length:** 106 mm

### Stinger

**Chuck Material:** Monel

**Max. Tensile Force:** >250 N

 compliance with EMC Directive

### Stinger Accessories Included

10 × DA 9984	Stainless Steel Rod
DB 3146	Chuck for Shaker
DB 3147	Chuck for Transducer
DB 3145	Chuck Tightening Collar
Calibration Chart	

### Accessories Available

Type 2646    DeltaTron® Amplifier