JCI 247 Faraday Pail

A unit for measurement of electrostatic charge on components and quantities of powders and liquids

The JCI 247 Faraday Pail provides the capability to measure the nett quantity of charge on a wide variety of items – including powders, liquids. Charge received into the pail is measured using a JCI 178 Charge Measuring Unit. This provides opportunity to measure charge within 20 and 200nC ranges of sensitivity – with a resolution down to 10pC. Higher sensitivity measurements may be made with a high sensitivity version of the JCI 178. Readings are zeroed by the 'Zero' button on the JCI 178. The JCI 178 includes an analogue output so charge measurements can be recorded.

The JCI 247 comprises a support plate mounted on high quality insulation onto which the removable pail sits. Connection for charge measurement is made via a BNC connector on the side of the main casing. Charge measurement is best made using a virtual earth charge measurement unit, such as the JCI 178.

The charge appearing on the outside of the pail is equal to the nett quantity of charge placed into the pail. It is not necessary that the charge introduced conducts to the pail, so measurements are equally applicable to insulating materials and conducting components placed into the pail. The pail is adequately deep compared to its diameter so that all charge introduced into the pail couples to the pail. The outer shield ensures that measurements are little affected by nearby static charges on people or surfaces. However, it is wise for the operator to wear outer clothing that can dissipate static charge easily and to be bonded to earth.

If there is any doubt about the quality of the electrical insulation mounting the pail then this may be tested by observing the stability of the zero reading and of the reading with charge introduced into the pail.

The top cover and the pail can easily be removed for emptying the pail and for cleaning.

JCI 247 Faraday Pail with JCI 178 connected

Why bother about static?

Many materials, in particular plastics, easily become electrostatically charged when rubbed against other materials. Such 'triboelectric' charging causes problems in many areas of industry. It can cause ignition of flammable gases and give shocks to personnel. It can make thin films and light fabrics cling, attract airborne dust and debris, damage semiconductor devices and upset the operation of microelectronic equipment.

The risks and problems arising from static electricity are best avoided by ensuring that static charge can dissipate over and through the surfaces of materials and away to earth more quickly than charge is generated. For normal manual handling and body motion activities this means the charge decay is preferably below ¼ second.

jci
John Chubb
Instrumentation

JCI 247 SPECIFICATION

Sensitivity with JCI 178:	• 20 and 200 nano-Coulombs full scale 10pC resolution • Sensitivity selected via on/off switch or by external control signal
Zero stability:	• Noise within ±10pC. Zero stable ±100 pC.
Accuracy and linearity:	• Within ±5%FSD on JCI 178 display and analogue output
Response:	• -3dB at 35Hz.
Display on JCI 178:	• 3½ digit liquid crystal display of charge directly in pico-Coulombs with polarity and `LO BATT' indication
Audio alarm:	• Pulsing audio signal when above user set level
JCI 178 Controls:	• On/off slide switch: off - range 1 - range 2 • Screwdriver set alarm threshold • Screwdriver zero setting adjustment
JCI 178 Power supply:	• Replaceable PP3 battery • via 8w mini DIN from external floating 12V supply • 2.1mm d.c. power connector for 12v 'Wall Cube' external floating power supply input
External connections:	• via 8w mini DIN connector: - analogue output signal (±2V FSD) - sensitivity range indication and sensitivity external control - earth - external power supply inputs • 2.1mm d.c. power input
Earth bonding:	• earth connection terminal on side of mounting frame
Dimensions:	• Pail: 300mm diameter 490mm high • Shielding container: 410mm diameter 580 mm tall • Weight: about 7½ kg

HELP LINE

JCI offers consultancy through which we advise and assist customers who need to assess and overcome problems with static electricity. We also test customer materials for static charge dissipation and capacitance loading performance.

JCI 247 with top cover shield off to show pail

The business of JCI is the design, development, manufacture and marketing of high quality instruments for electrostatic measurements. JCI also carries out electrostatic testing of materials, consultancy and calibration of JCI instruments to BS 7506: Part 2: 1996.

For further information contact Dr John Chubb at:
Unit 30, Lansdown Industrial Estate, Gloucester Road, Cheltenham, GL51 8PL, UK
(Tel:+44 (0)1242 573347 Fax:+44 (0)1242 251388 jchubb@jci.co.uk http://www.jci.co.uk)

jci
John Chubb Instrumentation