

JCI 147 Faraday Pail

INTRODUCTION

The JCI 147 Faraday Pail is an accessory for use with the JCI 140 Static Monitor. Together they make a sensitive instrument for precise and reliable measurement of electrostatic charge placed in the pail, with a resolution down to 1pC. The unit comprises a Faraday Pail mounted on high quality insulation in a well defined location relative to the sensing aperture of the JCI 140 Static Monitor. Charge placed in the pail raises the voltage of the pail a little, according to its capacitance. This increase in voltage is measured by the JCI 140. The pail is relatively deep (a height to diameter ratio of 1.5) so all charge introduced into the pail couples to the pail so long as it is not filled too full - not above about 40%.

The charge appearing on the outside of the pail is equal to the net quantity of charge placed in the pail. It is not necessary that the charge introduced conducts to the pail, so measurements are equally applicable to insulating and conducting materials. The shielding around the pail ensures that measurements are not affected by nearby static charges on people or surfaces.



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The attraction of a Faraday Pail based on a 'field mill' type fieldmeter is the near zero charge leakage (insulation resistance typically 10^{14} Ohms or more) and the high sensitivity. If there is any doubt about the quality of the electrical insulation this may easily be tested by first temporarily earthing the pail and then observing the stability of the zero charge reading on the JCI 140. With some charge placed in the pail the lack of leakage is observed by noting how slowly the reading decreases.

The JCI 140 Static Monitor is easily removable from the mechanical arrangement and can be used in its own right for other measurement purposes.

SPECIFICATION FEATURES

Sensitivity:	<i>2,000 and 20,000 pico-Coulombs full scale 1pC resolution Sensitivity selected via on/off switch or by external control signal</i>
Zero stability:	<i>Noise within ± 1 pC. Zero stable to ± 10 pC.</i>
Accuracy & linearity:	<i>Within $\pm 5\%$ FSD on display and analogue output</i>
Display:	<i>3½ digit liquid crystal display of charge directly in pico-Coulombs with polarity and 'LO BATT' indication</i>
Audio alarm:	<i>Pulsing audio signal when above user set level</i>
Controls:	<i>On/off slide switch: off - range 1 - range 2 Screwdriver set alarm threshold Screwdriver zero setting adjustment</i>
Power supply:	<i>Replaceable PP3 battery JCI 142 'Wall Cube' supply via 2.1 mm d.c. power connector Any external 12V floating supply via 8w mini DIN connector</i>
External connections:	<i>Via 8w mini DIN connector: - analogue output signal (± 2 V FSD) - sensitivity range indication and selection - earth - external power supply inputs 2.1 mm d.c. power input</i>
Earth bonding:	<i>Earth connection terminal on side of mounting frame</i>
Dimensions:	<i>Overall 180 mm x 180 mm baseplate, 335 mm high Pail 50 mm diameter, 75mm high, 50mm aperture in shield Weight: about 3 kg</i>
Option F:	<i>Fast response (3 ms) Static Monitor (for standalone use). See JCI 140 Datasheet</i>



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Contact Information ►

For further information on JCI Chilworth products and services visit:

www.jci.co.uk

email: sales@jci.co.uk

For further information on Chilworth Global process safety services visit:

www.chilworth.co.uk

email: info@chilworth.co.uk

Chilworth Technology Ltd
Beta House, Southampton Science Park
Southampton, SO16 7NS, UK

Tel : +44 (0)23 8076 0722

Fax: +44 (0)23 8076 7866