

JCI 131 Electrostatic fieldmeter

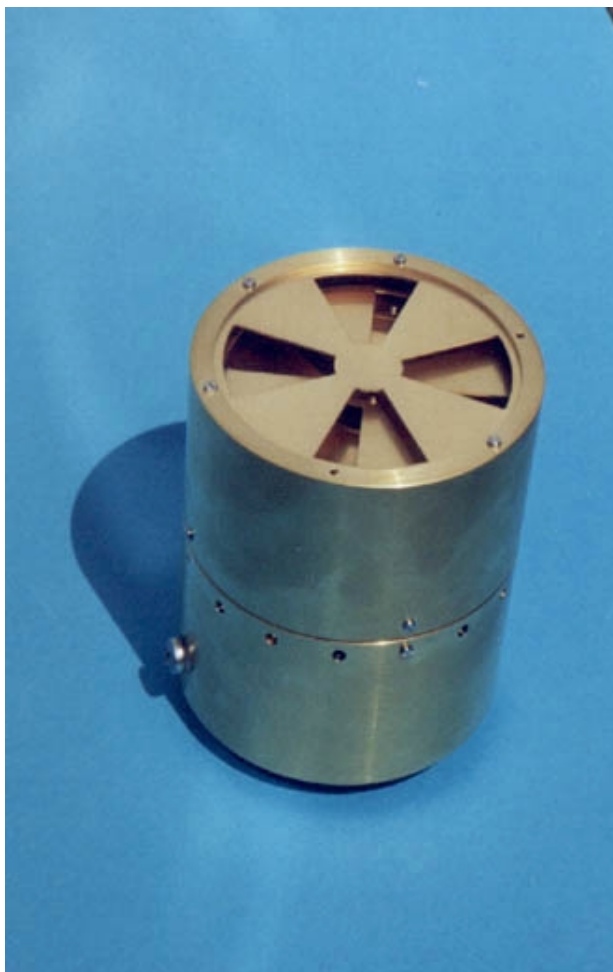
for precise, high resolution continuous measurement of electric fields in adverse environmental conditions

The JCI 131 Electrostatic Fieldmeter is a compact and robust instrument for the precise measurement of electric fields in adverse environmental conditions. It is particularly suitable for long term continuous monitoring of atmospheric electric field conditions - such as those associated with thunderstorm and volcano activity.

Electric field measurement sensitivities of 2, 20, 200 and 2000kV m⁻¹ are provided with high precision (better than 1%), low noise and a stable zero (both around 1V m⁻¹). Used as a potential probe, well away from nearby structures, the sensitivity is about 10kV m⁻¹ per kV of local space potential. The JCI 131 head unit requires a regulated power supply of 10-18V. Analogue output signals are provided proportional to the electric field at the sensing aperture as 2V for 2, 20, 200 or 2000kV m⁻¹. Indication is provided of the sensitivity range of operation and this can be forced for remote range selection. The zero reading can be adjusted remotely.

The JCI 131 is based on a proprietary JCI design of 'field mill' electrostatic fieldmeter which does not need earthing of the rotating chopper (IEEE Trans Ind Appl 26 (6) Nov/Dec 1990 p1178). This design, together with use of an electronically commutated drive motor, is appropriate for long term continuous monitoring.

Immunity to adverse environmental conditions is achieved using large (6mm) gaps from critical sensing surfaces to all other nearby surfaces, long insulation surface tracking paths and a sealed region for the signal processing circuit board. An additional circuit can be included to provide continuous monitoring of operational health when JCI 131 fieldmeters are used for long term measurements in onerous operating conditions - such as long term atmospheric electric field measurements. Operational health monitoring is achieved by modulating the voltage of the

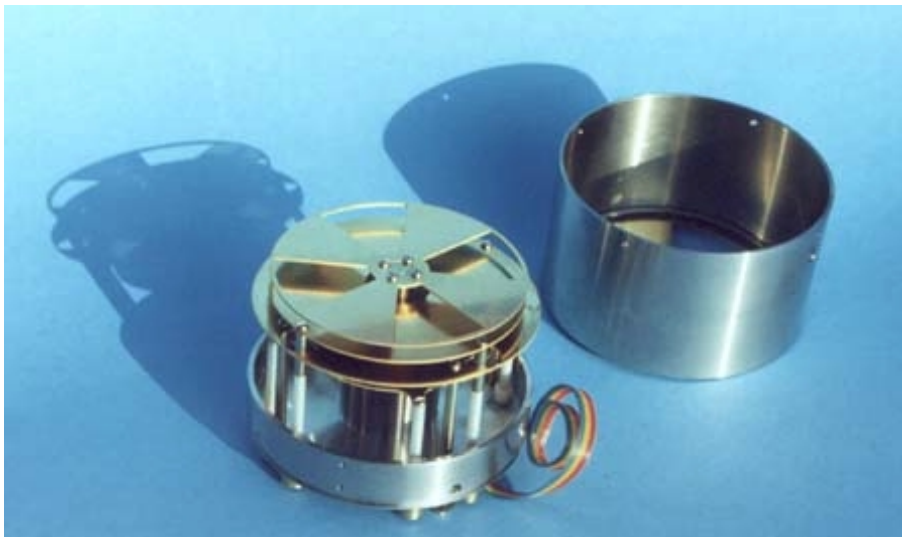


fieldmeter sensing head relative to the local earth with software assessment of the variation of the electric field observed compared to the variation expected.

Analogue output signals may conveniently be displayed and recorded on a microcomputer using a 'Picoscope' version digital storage oscilloscope. Alternatively, the sensing head unit can be fitted with an integral serial data interface for direct linkage to a microcomputer using proprietary software JCILOG. This provides remote display and direct numerical recording of observations - but only operates in MSDOS. JCILOG software includes provision for sensitivity range selection by the instrument, at the keyboard or automatically by software. It also includes provision for setting thresholds to select the frequency of data recording (from 4 s⁻¹ downwards) according to electric field values measured. Alternatively, up to four instruments, without interfaces, can be powered and operated from a JCI 168 Multiplexor Unit with observations displayed and recorded at up to 100 sets of readings a second using software JCILOG4.

JCI 131 SPECIFICATION

Sensitivity ranges: signal	<ul style="list-style-type: none">• 2, 20, 200 and 2,000 kV m⁻¹ full scale• Sensitivity selected via on/off switch or by external control
Zero stability:	<ul style="list-style-type: none">• Noise within 1V m⁻¹ p-p short term.• Zero stable ± 50 V m⁻¹ long term
Accuracy and linearity:	<ul style="list-style-type: none">• Within $\pm 1\%$FSD of each operating range
Response:	<ul style="list-style-type: none">• -3dB down at about 7Hz
Zero adjustment	<ul style="list-style-type: none">• external adjustment by potentiometer between ± 1-2V regulated supply via zero adjust connection
Controls:	<ul style="list-style-type: none">• automatic selection of sensitivity range may be overridden by holding range indicating signal lines HI (+5V) or LO (earth)
Power supply:	<ul style="list-style-type: none">• 10-18V 400mA smoothed d.c. supply
Connections:	<ul style="list-style-type: none">• via 19w Mil connector on the back of the fieldmeter (Pattern 105. Socket: AB05 210014-19SN00 Free plug: AB05 602714-19PN00)
Signal outputs:	<ul style="list-style-type: none">• 2.0V for 2, 20, 200 or 2000kV m⁻¹ FSD for ranges 1, 2, 3 & 4.• Logic level indication of sensitivity range (0V or 5V LO/HI)
Mounting:	<ul style="list-style-type: none">• on back of head unit 6 holes tapped M3 x 6mm deep on 95mm PCD and 6 holes tapped M3 x 6mm deep on 74mm PCD. (Connector casing within 39mm dia)
Operating environments:	<ul style="list-style-type: none">• 0-30C, 20-100%RH including direct rain precipitation.
Earth bonding:	<ul style="list-style-type: none">• via mounting
Dimensions:	<ul style="list-style-type: none">• 100mm diameter, 115mm long.• Weight: about 3 kg
Calibration:	<ul style="list-style-type: none">• the sensitivity is set up in manufacture on the basis of measurements whose accuracy is traceable to National Standards. Option for formal Calibration to BS 7506: Part 2: 1996 Annex A2



Internal structure of JCI 131 fieldmeter

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

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.

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