

JCI131/JCI131F Electrostatic Fieldmeter

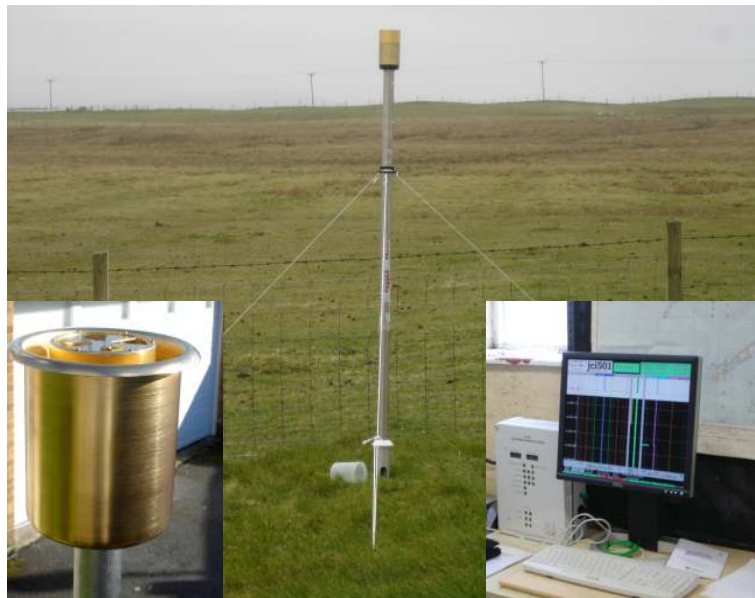
The JCI 131 is a 'field mill' type Electrostatic Fieldmeter for precise, high resolution, continuous measurement of electric fields in adverse environmental conditions.

INTRODUCTION

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 fields - such as those associated with thunderstorm and volcano activity.

Electric field measurement sensitivities of 2, 20, 200 and 2000 kV 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 10 kV m⁻¹ for 1kV of local space potential. The JCI 131 Head unit requires a regulated power supply of 18-36V. This may conveniently be provided by operation in conjunction with a JCI 134 Base Station. The JCI 134 also digitally displays the magnitude of the DC electric field at the sensing aperture.

Analogue output signals are provided proportional to the electric field at the sensing aperture as 2V for 2, 20, 200 or 2000 kV m⁻¹. Indication is provided of the sensitivity range of operation and this can be forced to a selected range in remote operation. The zero setting can be adjusted remotely.



JCI 131 shown as part of the JCI 504 Lightning Warning System.

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 a shield around the sensing head at a Frequency of half the chopping frequency. The operational health signal is extracted by phase sensitive detection with no interaction to the basic electric field signal. The health signal can then be compared to the signal expected.

Analogue output signals may be displayed on a JCI 134 or JCI 234 Base Unit and/or displayed and recorded on a microcomputer using a 'Picoscope' digital storage oscilloscope. For monitoring atmospheric electric fields it is appropriate to mount the fieldmeter sensing head at the top of a pole – for example a JCI 137.

With a 2m high mounting an ambient atmospheric electric field of 1 kV m^{-1} will give a reading around 20 kV m^{-1} .

The JCI 131F (fast response version) is also available and has been developed for accurate measurement of electric fields near power lines. When used in conjunction with the JCI 234 base station, the AC field component in the range of 50-60 Hz can be displayed separately from the DC field component.

SPECIFICATION FEATURES

Sensitivity ranges:	2, 20, 200 and 2,000 kV m ⁻¹ full scale Sensitivity selected automatically or by external control signals
Zero stability:	Noise within 1V m ⁻¹ p-p short term. Zero stable +50 V m ⁻¹ long term
Accuracy & linearity:	Within +1%FSD of each operating range
Response:	dB down at about 7Hz
Zero adjustment:	External adjustment by potentiometer between +1-2V regulated supply via 'zero adjust' connection
Controls:	Automatic selection of sensitivity range may be overridden by holding range indicating signal lines HI (+5V) or LO (earth)
Power supply:	18-36V, 400mA smoothed d.c. supply
Connections:	via 19w Mil connector on the back of the fieldmeter (Pattern 105. Socket: AB05 210014-19SN00)
Free plug:	B05 602714-19PN00)
Signal outputs:	2.0V for 2, 20, 200 or 2000 kV m ⁻¹ FSD for ranges 1, 2, 3 & 4. Logic level indication of sensitivity range (0V or 5V LO/HI)
Mounting:	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:	0-40C, 0-100%RH including direct rain precipitation.
Earth bonding:	via mounting and power supply cable
Dimensions:	100mm diameter, 250mm long. Weight: about 3 kg
Calibration:	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



JCI Chilworth manufactures a wide range of high quality, state of the art electrostatic instrumentation. We also carry out servicing and repairs for JCI instruments, and where appropriate calibration traceable to national and international standards. **JCI Chilworth** is part of **Chilworth Global**.

Chilworth Global brings together leading expert consultants in the fields of electrostatics and process safety, and GLP compliant laboratories, to provide a single point of contact for all electrostatic and process safety needs. Our laboratories provide material properties data for electrostatic problems and hazards, fire and explosion hazards (including liquids, vapours, gases and powders), chemical reaction hazards and regulatory testing. Our consultant engineers are all experienced in process safety, with individual expertise that includes electrostatics, chemical reaction hazards, and other particular aspects.

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