SPICER CONSULTING SC07LF

MAGNETIC FIELD CANCELLING SYSTEM

PRELIMINARY TECHNICAL DATA

- CANCELS MAGNETIC FIELDS
- BANDWIDTH 0.005 HZ – 5 kHZ
- RMS AND PK–PK MEASUREMENTS
- 40 MILLIGAUSS PK–PK RANGE
- CHART RECORDER INTERFACE
- PSEUDO–DC PERFORMANCE
- 20 X FIELD REDUCTION TYP.
- 3.5 DIGIT LCD PANEL METER
- 1 MICROGAUSS RESOLUTION
- COMPUTER INTERFACE

The SC07LF is an electronic system for reducing alternating ambient magnetic fields. One application of the SC07LF is to improve the performance of electronic instruments which are sensitive to magnetic fields such as, electron microscopes and electron beam metrology tools. The SC07LF is an extended bandwidth version of the SC07 Magnetic Field Cancelling System. For a description of the SC07 system, mechanical and installation details, please see the SC07 data sheet. The SC07LF is mechanically identical to the SC07.

The SC07 system was designed principally to cancel magnetic fields arising from 50/60 Hz power sources. However, lower frequency magnetic fields arising from rotating machinery, fan rotors etc can also be cancelled by the SC07. Useful cancelling down to a lower frequency limit of 0.5 Hz is an SC07 feature. The SC07LF has significantly extended low frequency response providing pseudo DC performance. The lower frequency response has been extended by two decades to 0.005 Hz. This enables useful cancelling of transient DC magnetic fields. Such fields may be caused by, opening and closing metal doors, movement of metal furniture, elevators (lifts) and electric vehicles such as trains. The SC07LF can reduce a 20 milligauss pk–pk change in the ambient field to below 1 milligauss.

The SC07LF is not intended to replace the SC07 in all applications. The SC07LF should be used only in those applications where transient DC fields are a problem. The 50/60 Hz cancelling performance of the SC07LF is similar to the performance of the SC07, however, the much extended low frequency reponse of the SC07LF results in a corresponding increase in the low frequency noise limit of the system. The detector noise limit of the SC07 is .002 milligauss pk–pk which is low enough to be ignored in most applications. The detector noise limit of the SC07LF is 0.160 milligauss pk–pk which is low enough to give useful cancelling (down to 0.2 mG pk–pk typ.) but not so low that it can always be ignored.

The presence of the earth's magnetic field causes some practical difficulties to field cancelling systems. For example, if the magnetic field sensor is moved while operating, a very large transient is caused by the movement through the earth's field. The time taken for the system to recover from this transient overload depends on the low frequency response of the system. The SC07 recovers in about 5 seconds but the SC07LF, with response to 0.005 Hz, may require several minutes. Hence some extra care is required in the application of the SC07LF.

SPECIFICATION SC07LF

PRELIMINARY TECHNICAL DATA

PARAMETER	VALUE/DESCRIPTION
COORDINATE SYSTEM	X, Y, Z rectangular cartesian
UNITS	Gauss, Tesla switchable
FIELD CANCELLING	
Components cancelled	X, Y, Z field components
Dynamic range	+/−12.5 milliGauss pk per axis
Field reduction ratio	20 X (min) at 50/60Hz
Bandwidth	0.005 Hz – 5000 Hz
Detector noise limit	.160 milliGauss pk−pk
FIELD MEASUREMENT	
Types	1. Real time field 2. Peak to Peak amplitude 3. True RMS amplitude
Display	
Pk−Pk & RMS	3.5 digit LCD panel meter
Real time	For oscilloscope display
Dynamic range	40 milligauss pk−pk
Meter ranges	X 1 range, 0 – 1.999 milliGauss X 10 range, 0 – 19.99 milliGauss X 100 range, 0 – 40.0 milliGauss pk−pk 0 – 20.0 milliGauss RMS (plus equivalent Tesla ranges)
Accuracy	
Peak to Peak	+/− 0.5% of reading +/− 0.005 mGauss
RMS	+/− 1.0% of reading +/− 0.005 mGauss
Real time bandwidth	0.05 Hz – 20 kHz
Trip range	0 – 5.0 milliGauss Pk−Pk 0 – 2.0 milliGauss RMS
SIGNALS INTERFACE	
Analog (9 signals & analog Gnd.)	
X, Y, Z real time	500mV/mG, −10V to +10V, 10kohm Z,
X, Y, Z Pk−Pk	250mV/mG, 0V to +10V, 10kohm Z,
X, Y, Z RMS	500mv/mG, 0V to +10V, 10kohm Z,
Digital	TTL comp, Opt isol, active low
Outputs (9)	Open col. with 22K pullups, 3mA sink "TRIPPED−L" (1) "TRIPPED,X,Y,Z,PK,RMS−L" (6) "ON LINE−L" (1) "POWERLOSS−L" (1)
Inputs (1)	I−in (low) <=1.6mA at Vcc=+5V "RESET TRIP LATCH−L" (1)
Vcc (+5V) & Dig Gnd	– from user's interface
POWER	120/240V (+10%−20%), 50/60Hz, 50 VA

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