

Magnetic Field Countermeasure

- Magnetic Field Canceller System
- Magnetic Shielding Room

$$\int_V \frac{j(r') \times (r - r')}{4\pi|r - r'|^3} d^3r'$$

Magnetic
Stray field



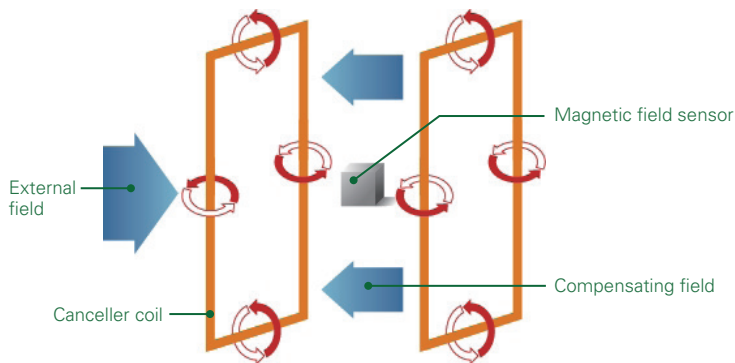


Countermeasure for Magnetic Field

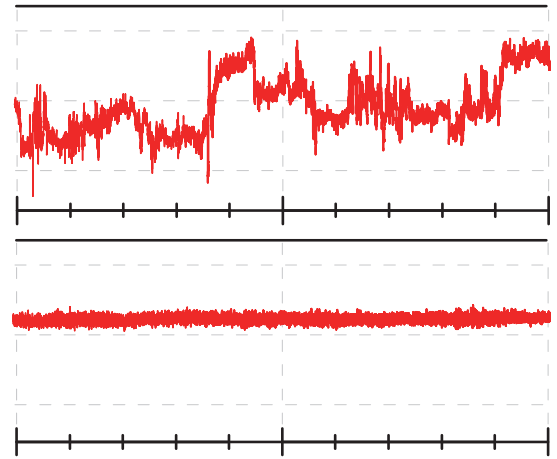
There is a growing need for countermeasures to stray magnetic fields, which are generally an adverse effect on the performance of scientific instruments. JEOL offers an extensive range of countermeasures originally to match the special characteristics of high-end scientific instruments.



Principles of Active magnetic field canceller



Active magnetic field canceller schematic

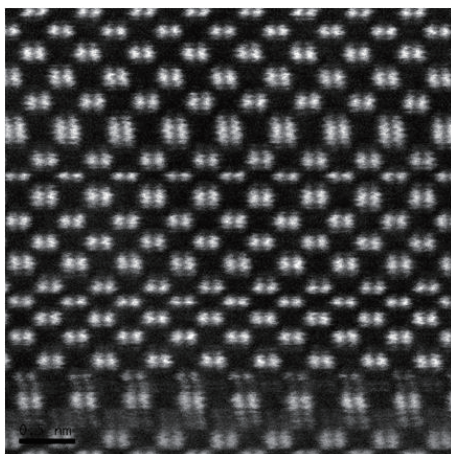


Time axis waveform: Top: Canceller OFF Bottom: Canceller ON

The fluctuating magnetic fields are detected by sensors installed near the instrument, triggering the canceller coils to output compensating magnetic fields in the opposite direction to cancel the magnetic fields around the sensors. Compared to passive shielding methods, the cost is significantly reduced, while still being able to effectively suppress stray magnetic fields. The optimal sensors and canceller coils are selected to match the unique conditions of each instrument and installation site to fully exploit the performance of the active magnetic field canceller.

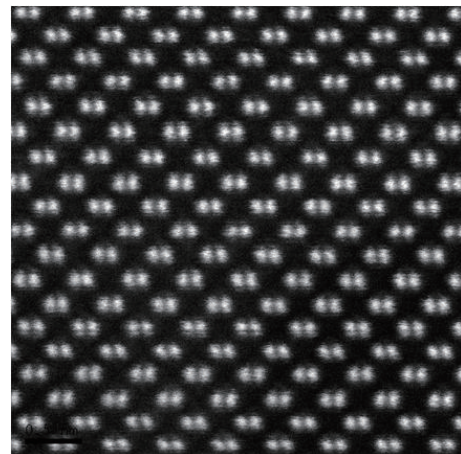


Active magnetic field canceller effect JEM-ARM200F image Sample:SI110 Magnification: × 25M



Active OFF

The effects of the fluctuating DC magnetic field disturb the electron beam, which can be seen as irregular distortion and noise on the observed image.



Active ON

The active magnetic field canceller reduces the effect of the fluctuating DC magnetic field, providing sharp, clear images.

Active magnetic field canceller

Generated by sources like railways, elevators and electrical power lines, causing the lineup of active magnetic field cancellers which have been developed

Magnetic Stray Field



Product lineup

Active magnetic field canceller configuration



Controller



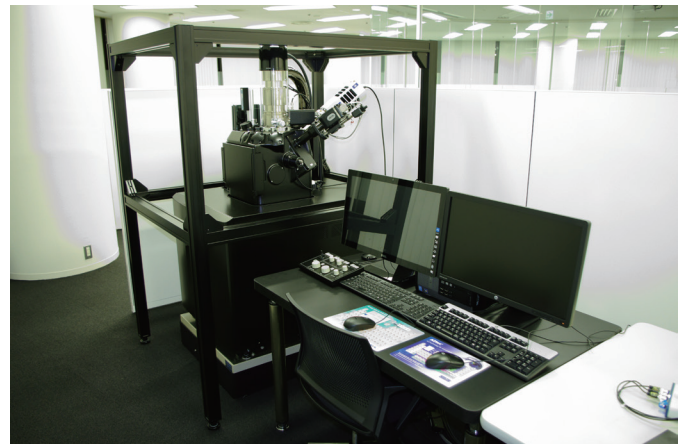
3-axis, separate type sensor



3-axis integrated sensor

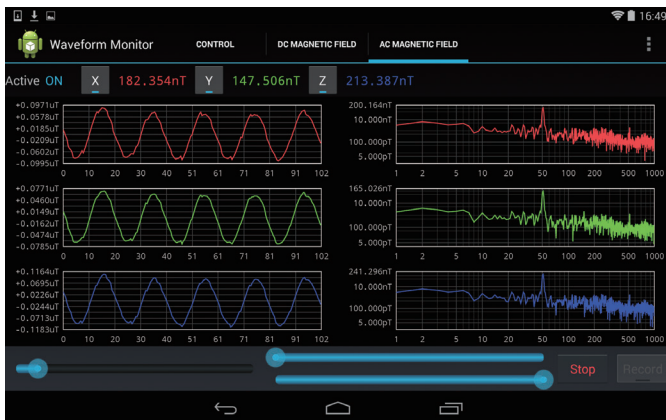


Canceller coil cage

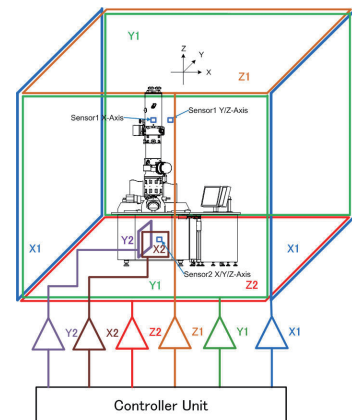


Installation example (JSM-IT300 cage)

Option



Magnetic field waveform monitoring system (EM-78220FWMS)



Gradient magnetic field · EELS system (EM-78230FEELS)

Real-time magnetic field waveforms are output from the controller to the tablet screen, allowing confirmation of the current state of the magnetic field fluctuation and the cancellation effect.

It is possible to enhance stability for atomic resolution TEM equipped with EELS.



Magnetic field canceller Compatibility table

	Applicable	Magnetic field	Canceller coil gauge/duct	Applicable Options
EM	JEM-ARM300F	EM-78210DAMC	Cage:60 mm square aluminum cage · Compatible with the wall-mounted duct	EM-78230FEELS EM-78220FWMS
	JEM-ARM200F			
	JEM-F200			
	JEM-210OF			
	JEM-2200FS			
	JEM-2800			
	JEM-2100Plus	EM-78300DAMC		EM-78220FWMS
	JEM-1400Plus			
SM	JSM-7100F	SM-78210DAMC SM-78300DAMC	Cage:30 mm square aluminum	EM-78220FWMS
	JSM-7200F			
	JSM-7610F			
	JSM-7800F			
	JSM-7800FPRIME			
XM	JXA-8530F	XM-78210DAMC	Cage:30 mm square aluminum	EM-78220FWMS
	JXA-8230	XM-78300DAMC		
AP	JAMP-9510F	AP-78210DAMC AP-78300DAMC	Cage:30 mm square aluminum	EM-78220FWMS
MP	JSM-6010Plus	MP-68020DAMC MP-68030DAMC	Cage:30 mm square aluminum	EM-78220FWMS
	JSM-6510			
	JSM-IT100			
	JSM-IT300			
IB	JIB-4000	IB-78210DAMC	Cage:30 mm square aluminum	EM-78220FWMS
	JIB-4610F	IB-78300DAMC		
NMR	JNM series	NM-78500DAMC	Cage:30 mm square aluminum	EM-78220FWMS
MS	JMS-700	MS-78210DAMC	Cage:30 mm square aluminum	EM-78220FWMS
	JMS-800D			
EB	JBX-6300FS	EB-78210DAMC	Cage:30 mm square aluminum	EM-78220FWMS
	JBX-9500FS			

Notes

- When planning to purchase environment countermeasure products an installation site survey will be required in advance.
- For instruments that are not listed in the compatibility table, please inquire directly to determine what options are available.
- In principle, there will be a fluctuating magnetic field generated in the outer portion of the canceller coils during the operation of the active magnetic field canceller.
- In some cases it may not be possible to install the wall-mounted canceller coil duct, depending on the building structure and instrument layout.

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