

DATA SHEET: FLUX series

Precision tunable magnetic field sources

Overview



High strength magnetic fields are used in applications that range from medical imaging to chemical analysis, material science and particle physics. Traditionally, tunable fields are produced using large electrical currents, requiring bulky power supplies and cooling systems. The Elemental Instruments **FLUX series** instead uses a special configuration of permanent magnets, offering an unparalleled combination of performance, robustness, reliability and compactness.

Applications

- Magnetic material characterisation
- Wafer testing
- Spintronics
- Quantum spin technologies (e.g. diamond microscopes)
- Nuclear magnetic resonance (NMR)
- Magnetic field control in research laboratories
- University and school teaching laboratories and demonstrations

FLUXvario: The FLUXvario is a cost-effective solution that is robust and user-friendly. It provides in-plane magnetic fields with strength that can be widely varied with the turn of a dial. It is ideally suited to educational laboratories and physics demonstrations in schools and universities.

FLUXuni: The FLUXuni is a high quality instrument designed to provide unparalleled simplicity, reliability and robustness in scientific and industrial applications. It provides high-uniformity in-plane magnetic fields with strength that can be varied by more than an order of magnitude with the turn of a dial.

FLUXmoto: The FLUXmoto is designed to meet the most rigorous standards in scientific and industrial applications. It provides high-uniformity in-plane magnetic fields with precisely motor-controlled strength and orientation, together with real-time magnetic field monitoring. The field strength can be varied by more than an order of magnitude, and the orientation over a full 360°.

Warnings



The FLUX Series generate **strong DC magnetic fields** localised close to the sample platform. Persons with pacemakers or other medical implants should take appropriate precautions. Be warned that magnetic objects will experience strong forces when in proximity to the sample platform. Strong magnetic fields can also damage electronic devices such as mobile phones.

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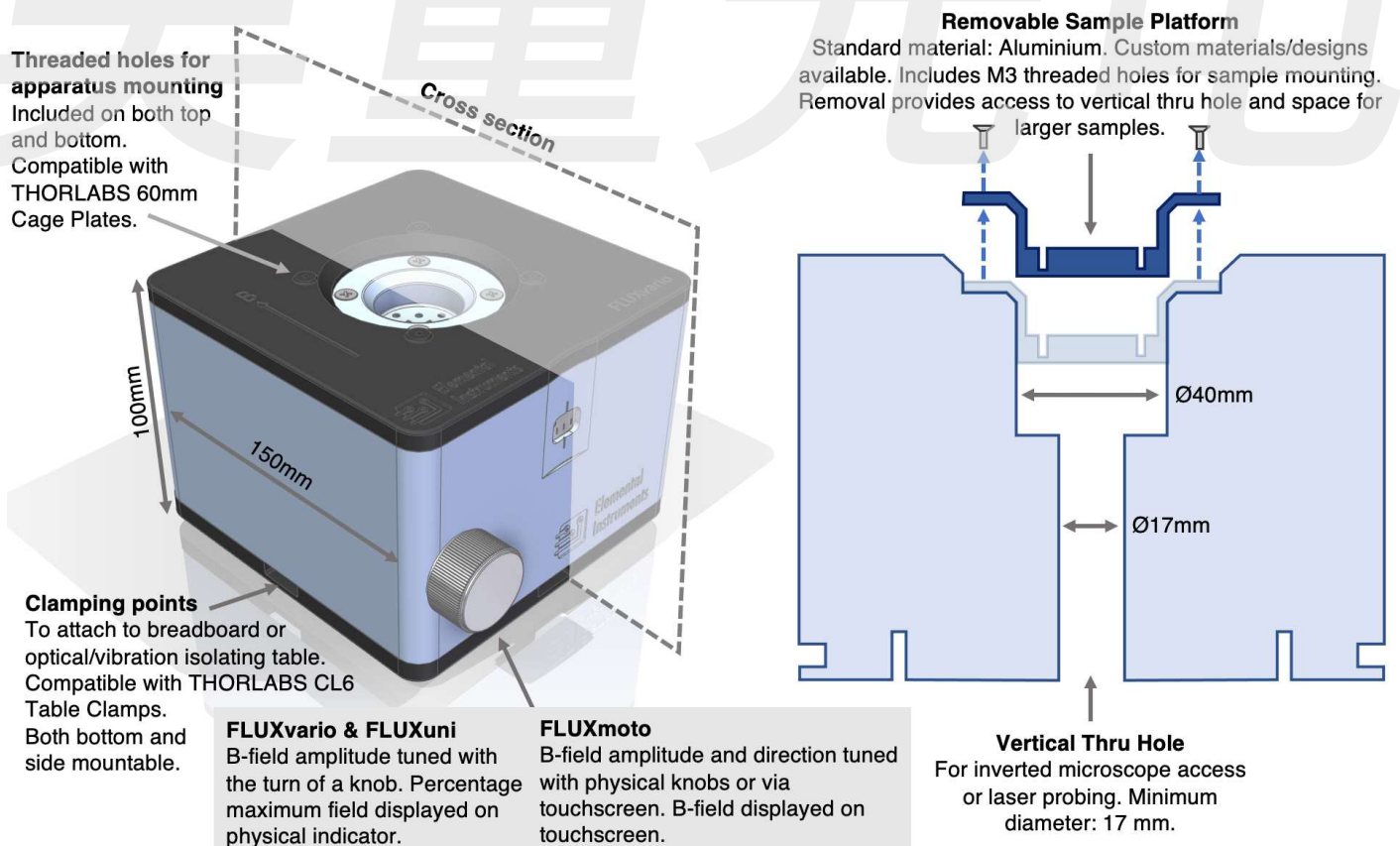
上海昊量光电设备有限公司 Phone: 4006-888-532 WeChat: Auniontech Website: www.auniontech.com E-mail: info@auniontech.com

The **FLUX series** are designed for easy, intuitive, and low-overhead operation. Thin samples can be placed at the base of the sample platform and affixed using the nylon screws provided. Alternatively, the sample platform can be removed, providing access to a vertical thru hole and a large sample space. The sample platform is removed by unscrewing the four M4 screws on top of the device. The vertical thru hole is designed to allow for laser access and for incorporation within an inverted microscope. **WARNING:** high magnetic fields are present, use non-magnetic tool when unscrewing (e.g. stainless steel)!

There are four threaded holes on both the top and bottom of the **FLUX series** devices. These are compatible with the THORLABS 60mm cage mount system, allowing the devices to be easily integrated with other apparatus. There are clamping points on the bottom of each side of the device to enable easy clamping to a breadboard or optical/vibration damping table (e.g. using THORLABS CL6 Table Clamps). There are also twelve M4 threaded holes in the base of the device. These can be used to mount the device on its side.

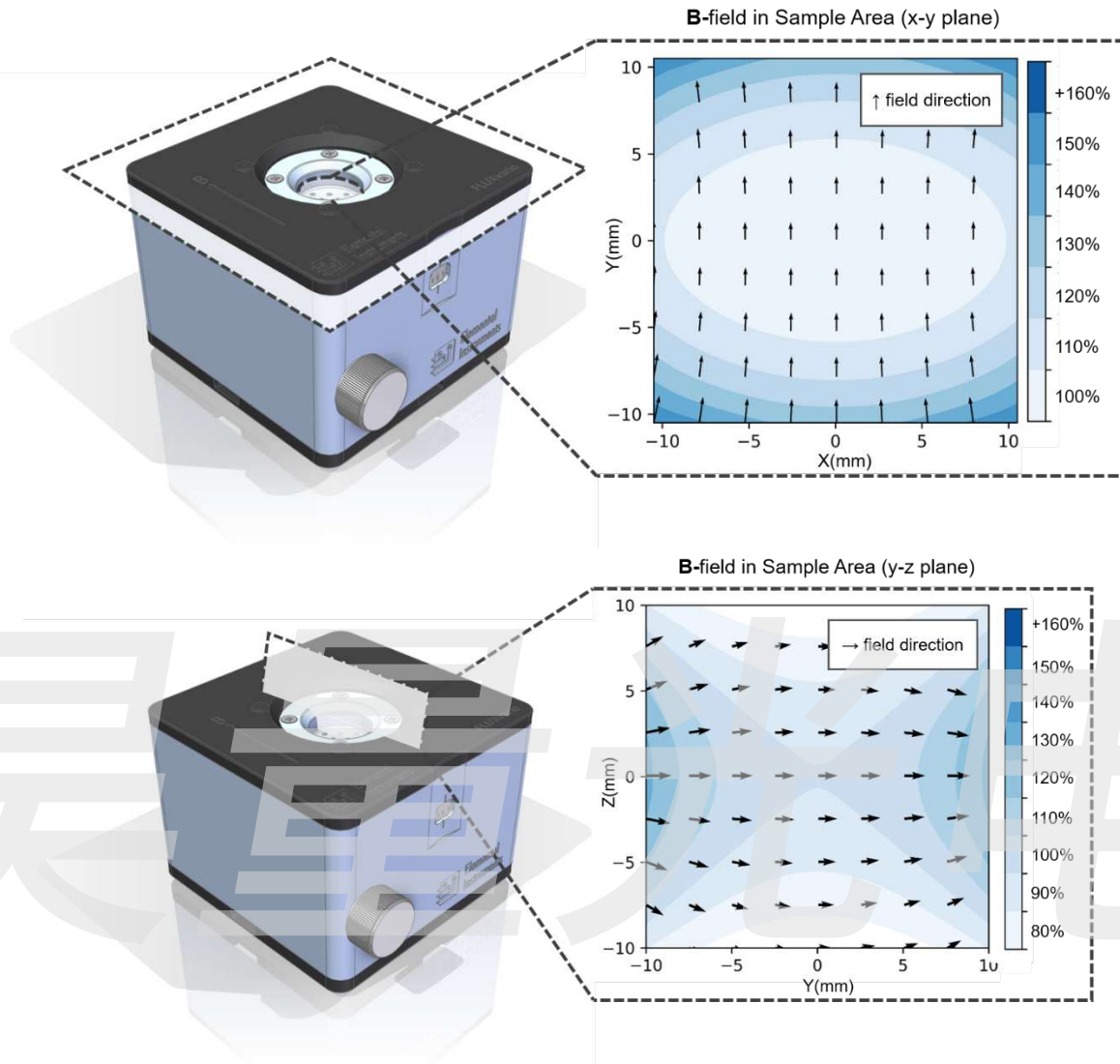
The **FLUXvario** and **FLUXuni** allow continuous magnetic field tuning from B_{min} to B_{max} using the physical dial on the front panel. The numbers shown by the indicator represent the field strength as an approximate percentage of B_{max} (i.e. "+50" is 50% of B_{max}). The polarity of the field can be reversed by continuously turning the dial through the minimum. The polarity is indicated by the sign of the indicator (i.e. "-50" is 50% of B_{max} in the opposite direction). The positive field direction is indicated by the arrow located on top of the device.

The **FLUXmoto** features motorised magnetic field control. It allows continuous tuning of the magnetic field from B_{min} to B_{max} , together with full 360° in-plane angle tuning. Both strength and amplitude can be tuned with physical dials or via the touchscreen on the front panel. The magnetic field strength and amplitude are displayed in real-time on the touchscreen.



Magnetic field direction and location

The direction of the magnetic field produced by the **FLUX series** is in the horizontal plane. The field has maximum uniformity at the centre of the sample platform. Its extent in both the x-y (horizontal) and y-z (vertical) plane is shown in the diagrams below.



		Specifications		
		FLUXvario	FLUXuni	FLUXmoto
Magnetic	Direction	horizontal		tuneable in horizontal plane
	Field direction tuning	-		360°
	Field amplitude tuning	0.10-0.29 T (specified) 0.07-0.32 T (typical)		
	Homogeneity	Not specified	±2.5% within 10 mm ² area	
Physical	Size	150×150×110mm		
	Weight	6.5 kg		
	Temperature range	0 – 50°C		
	Active sample area	15x15mm		
	Motorised control	-		amplitude & direction
	Magnetic field readout	Physical percentage indicator		Displayed on touchscreen
	Electrical & cooling	Electrical requirements	none	
Cooling requirements		none		