

Field Monitoring

FL8000 Series

Field Probes & Kits

- FL8200/kit
- FL8009/kit
- FL8018/kit
- FL8040/kit
- FL8060/kit

FI8000 Laser Probe Interface

Features:

- Capable of measuring both continuous wave & pulse electric fields.
- Use of laser to deliver power-over-fiber allows continuous operation without recharging or replacing batteries.
- Correction factors from accredited ISO 17025 lab.

Application Standards:

- Automotive EMC
- Commercial EMC
- Aviation EMC
- Military EMC
- Wireless R&D

The FL8000 series is an advanced line of laser-powered Electric Field Probes, and associated Kits designed specifically for EMC radiated immunity test applications. Each Field Probe is an electrically small, separable axis sensor capable of measuring both continuous wave and pulsed electric fields. There are a total of five Field Probes available, each with a unique bandwidth, sensitivity, and dynamic range.

The field probe kits contain everything needed to operate its associated Field Probe. Remote control and laser power for the Field Probe is provided by the FI8000 Laser Probe Interface. A set of 20-meter fiber-optic extension cables and fiber-optic mating adapter are also provided with the kit. The use of a laser to deliver power-over-fiber (PoF) allows for continuous operation without recharging or replacing batteries. Additionally, this provides excellent RF isolation for the control system.

An ortho-angle mount and adapter foot are provided for ease of mounting in common orientations. When rotated about its ortho-angle mount, the probes provide excellent isotropic response. Attention was given to the mounting geometry and remote command set for the FL8000 series kits to allow seamless substitution with the legacy field probe kits.

Correction factors from an accredited ISO 17025 calibration lab are provided with each Field Probe. These factors can be loaded into a model FM7004A Field Monitor (sold separately) to automatically correct the probe readings at user-specified frequencies. When correction factors are applied, the true accuracy of the Field Probe can be realized.

The export classification for this equipment is EAR99. This equipment is controlled for export in accordance with the U.S. Export Administration Regulations. Diversion contrary to U.S. law is prohibited.



FL8000 Series

Field Probe Kits:

- FL8200/Kit
- FL8009/Kit
- FL8018/Kit
- FL8040/Kit
- FL8060/Kit

Specifications



Probe Model Number	FL8200	FL8009	FL8018	FL8040	FL8060
Frequency Range	5 kHz – 200 MHz	20 MHz – 9.3 GHz	20 MHz – 18 GHz	20 MHz – 40 GHz	20 MHz – 60 GHz
Axis Type	Separable X-Y-Z Axis				
Measurement Type	CW, AM & Pulse				
Field Strength Range (Single Range)	0.3 – 500 V/m	0.5 – 800 V/m	2 – 1000 V/m		
Dynamic Range	>64 dB		>54 dB		
Analog Rise Time (10 – 90% Typical)	300 us	300 ns	600 – 2400 ns (amplitude dependent)		
Isotropic Deviation (Measured at Ortho Angle)	±0.5 dB @ 10 MHz	±0.5 dB @ 100 MHz			
Resolution	<0.1 dB				
CW Damage Level	1000 V/m		1200 V/m		
Pulse Damage Level	5 kV/m (> 0.1% Duty)		6 kV/m (> 0.1% Duty)		
Linearity Error	±0.5 dB or ±0.3 V/m (Whichever is greater)	±0.5 dB or ±0.3 V/m (Whichever is greater) (±2.0 dB 20 MHz – 80 MHz)	±0.5 dB		
Temperature Stability (Over Operating Temperature Range)	±0.1 dB (Detection Circuit) ±0.5 dB (Complete System)		±0.5 dB		
Weight	150 g (5.3 oz)		227 g (8.0 oz)		
Dimensions (W x H x D)	42.3 x 52.4 x 52.4 mm (1.66 x 2.06 x 2.06 in) 29.2 mm (1.15 in) Spherical housing diameter 16.5 mm (0.65 in) Sensor radome height per axis		278 x 65 x 65 (10.9 x 2.6 x 2.6 in) 65 mm (2.6 in) Sensor head diameter		
Data Response					
Internal Sampling Rate	2 Msps				
Sampling Window	4 ms				
Time Between Sampling Windows	30 ms				
Minimum Pulse Width	1 ms	1 us	2 us (40 – 1000 V/m) Usable to 1 us (70 – 1000 V/m)		
Amplitude Accuracy (field aligned with sensor axis)					
Without Correction Factors Applied	±1.0 dB @ 10 MHz		±1.0 dB @ 100 MHz		
With Correction Factors Applied – Typical expanded measurement uncertainty – 95% Confidence Interval (Calibration Lab Dependent)	±1.1 dB (5 kHz – 200 MHz)	±1.1 dB (20 MHz – 1 GHz) ±2.1 dB (1 GHz – 9.3 GHz)	±1.1 dB (20 MHz – 1 GHz) ±2.1 dB (1 GHz – 18 GHz)	±0.81 dB (20 MHz – 1 GHz) ±1.7 dB (1 GHz – 40 GHz)	±0.81 dB (20 MHz – 1 GHz) ±1.7 dB (1 GHz – 60 GHz)
Environmental					
Operating Temperature	10° to +40° C				
Storage Temperature	-20° to +50° C				
Operating Altitude	Up to 2000 m				
Shock & Vibration	Normal Truck Transport				
Fiber-Optics					
Connector Type	E – 2000 Compact Duplex				
Bend Radius	>30 mm				
Pigtail Length (With Verification Loop)	1 m				
Maximum Single F/O Extension Length	100 m Contact AR Applications Team for requirements greater than 100 m.				

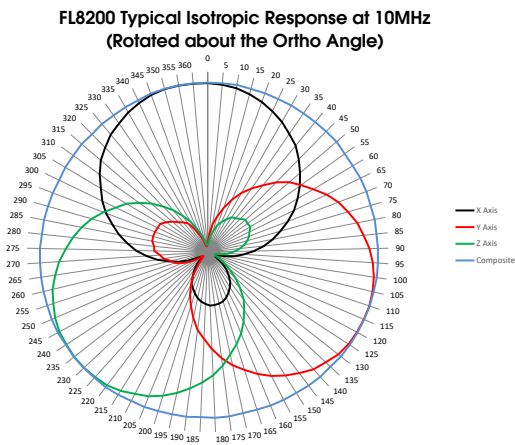
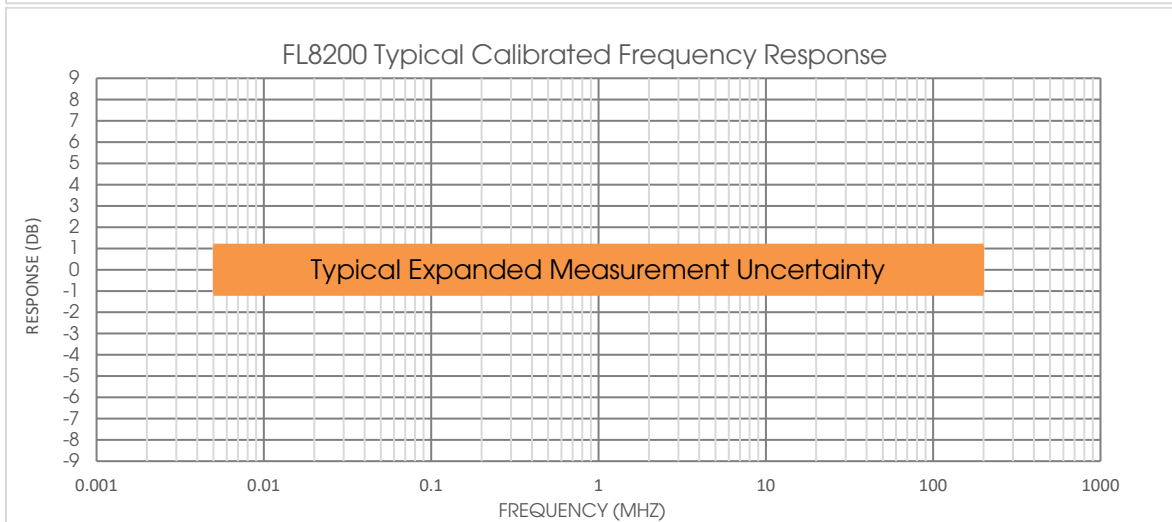
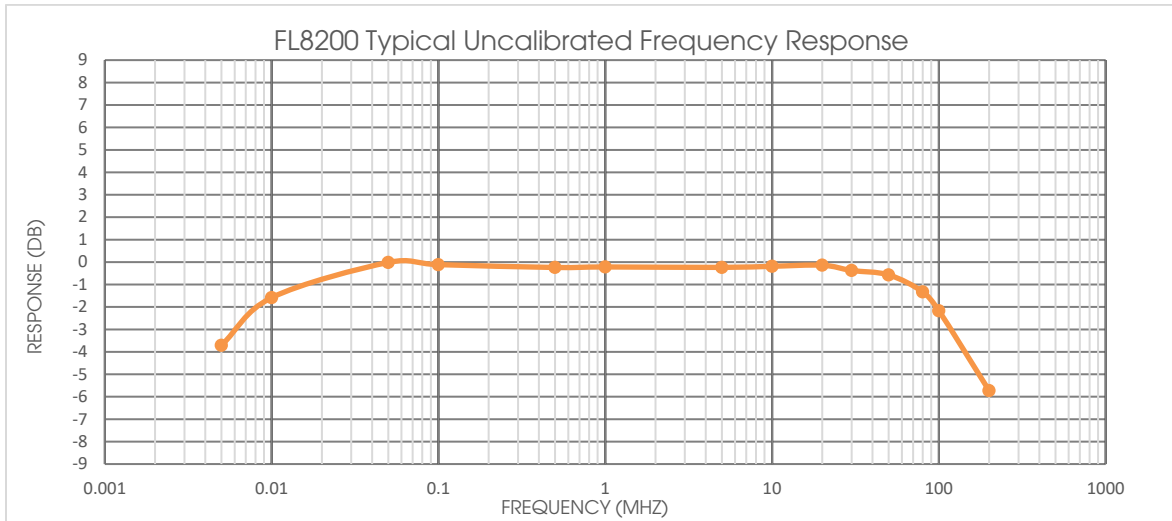
FL8000 Series

Field Probe Kits:

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- FL8018/Kit
- FL8040/Kit
- FL8060/Kit

Specifications

FL8200



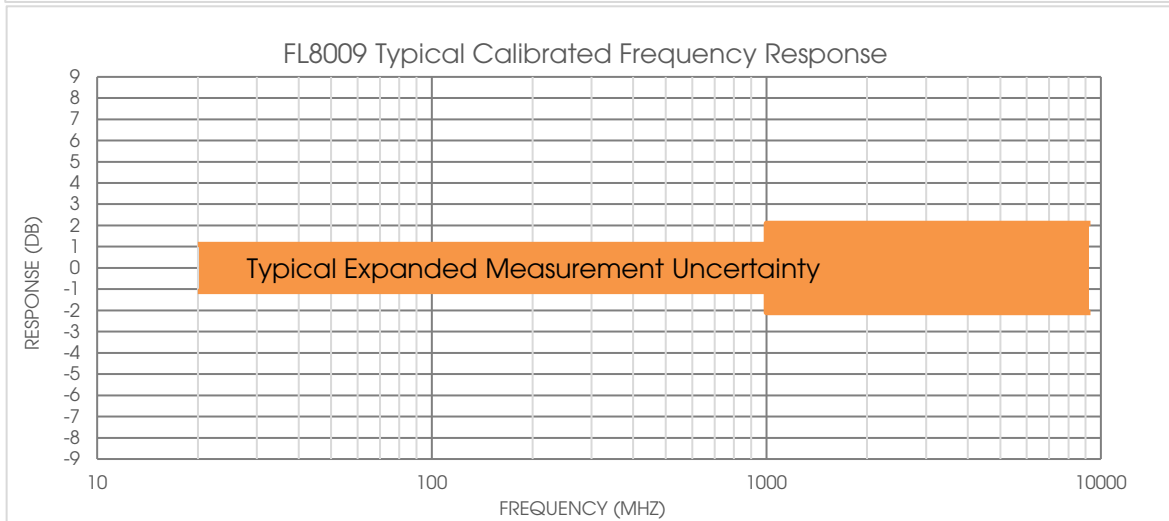
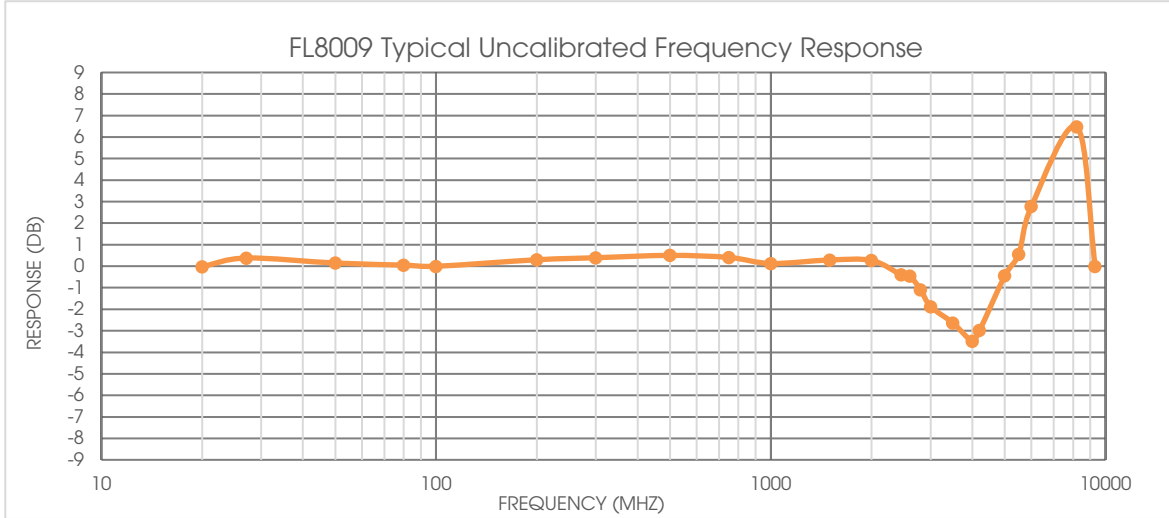
FL8000 Series

Field Probe Kits:

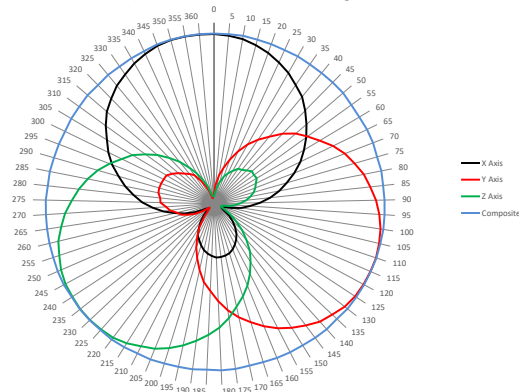
- FL8200/Kit
- FL8009/Kit
- FL8018/Kit
- FL8040/Kit
- FL8060/Kit

Specifications

FL8009



**FL8009 Typical Isotropic Response at 100MHz
(Rotated about the Ortho Angle)**



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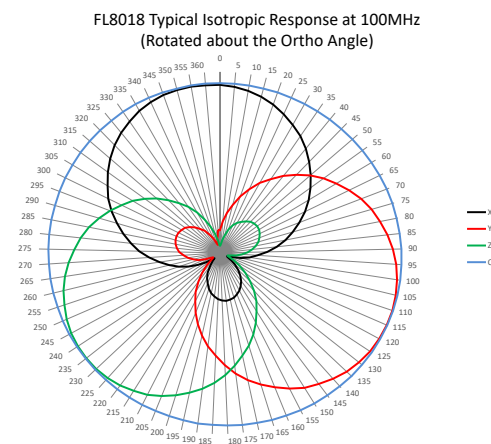
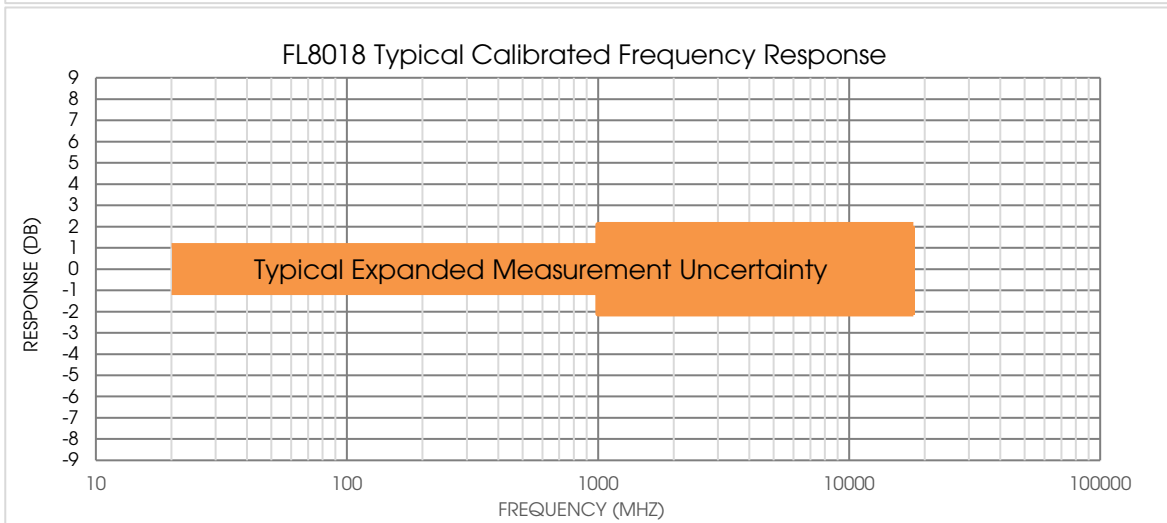
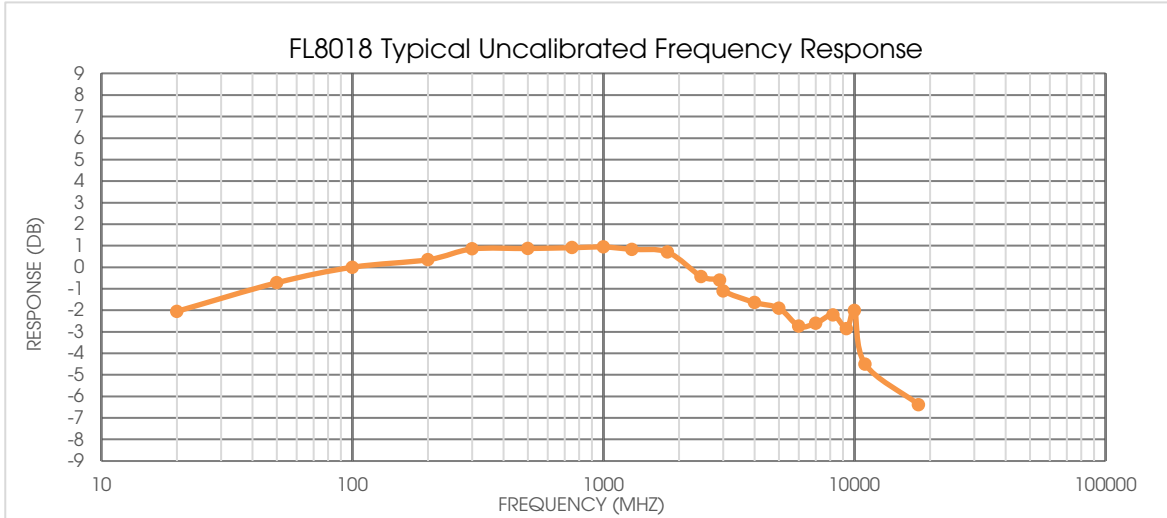
FL8000 Series

Field Probe Kits:

- FL8200/Kit
- FL8009/Kit
- FL8018/Kit
- FL8040/Kit
- FL8060/Kit

Specifications

FL8018



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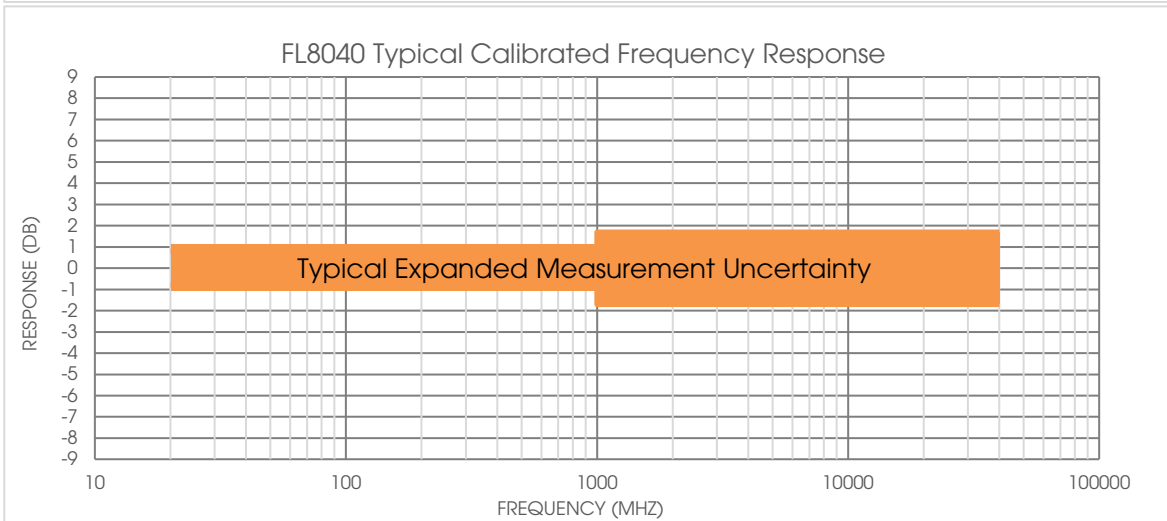
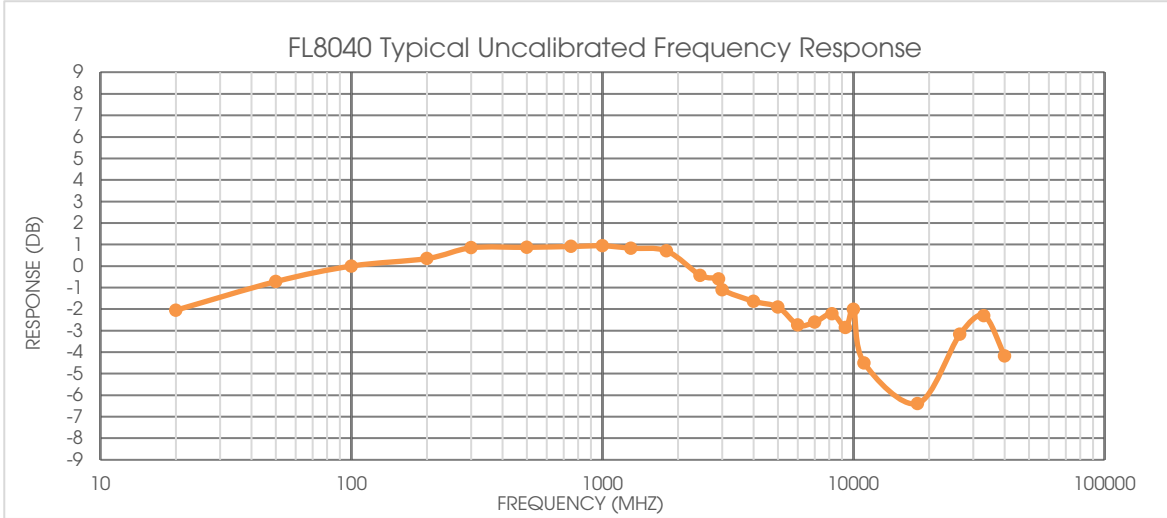
FL8000 Series

Field Probe Kits:

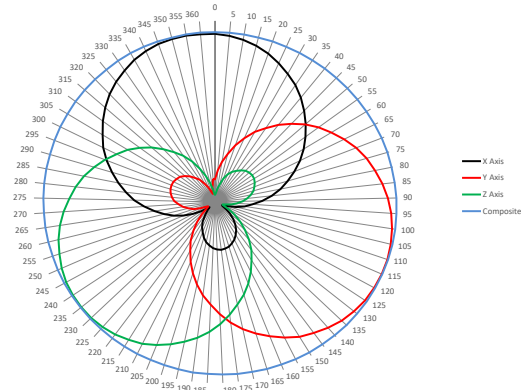
- FL8200/Kit
- FL8009/Kit
- FL8018/Kit
- FL8040/Kit
- FL8060/Kit

Specifications

FL8040



FL8040 Typical Isotropic Response at 100MHz
(Rotated about the Ortho Angle)



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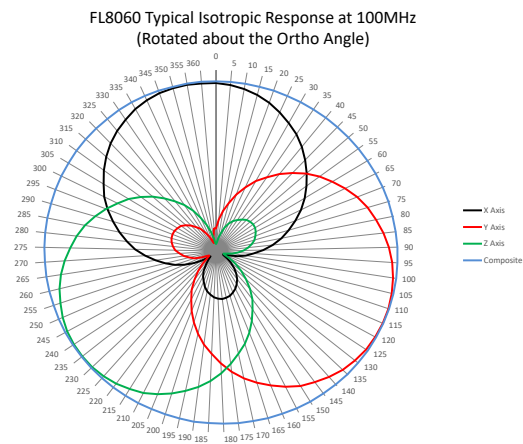
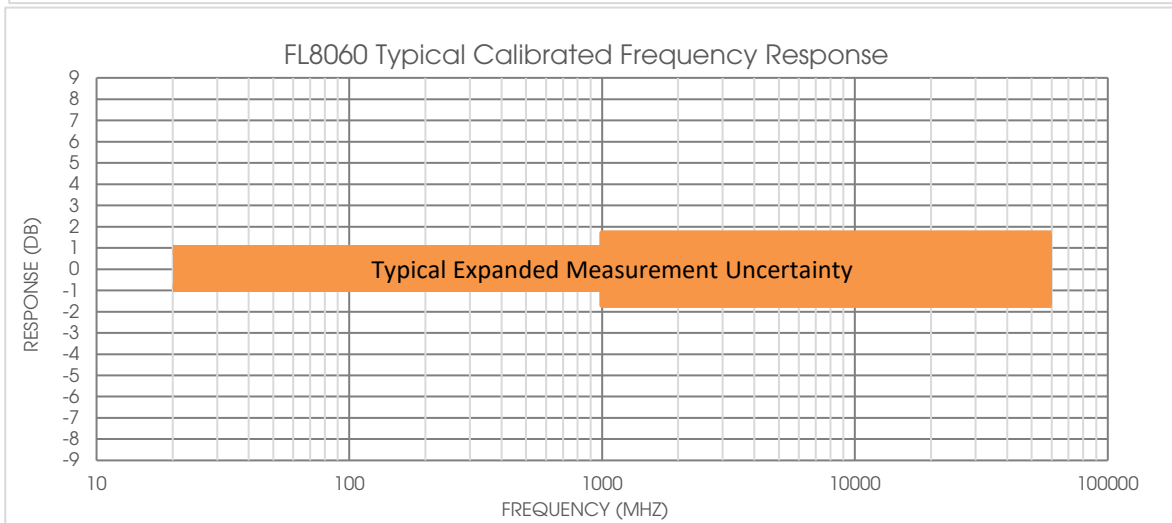
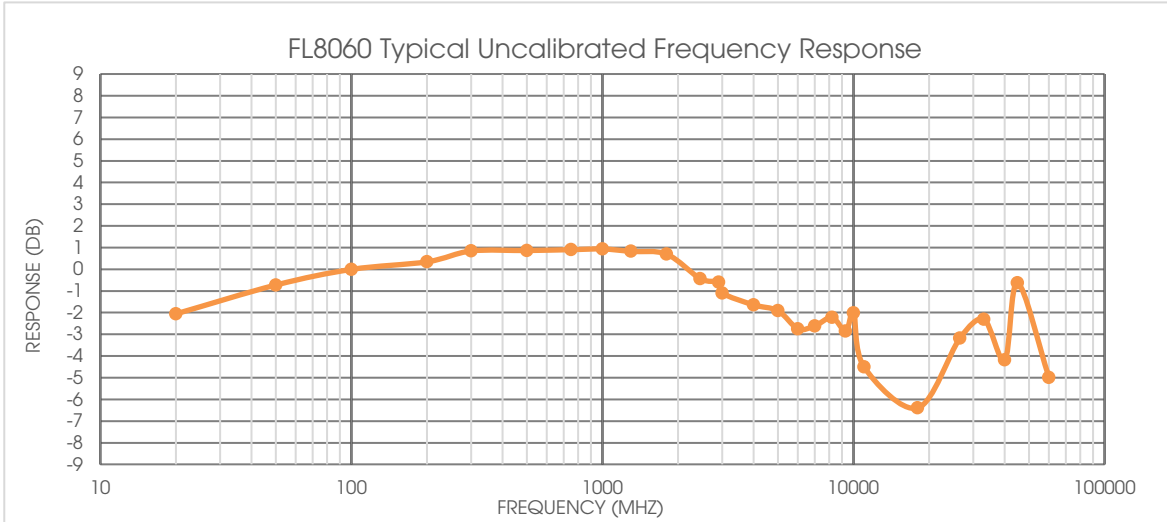
FL8000 Series

Field Probe Kits:

- FL8200/Kit
- FL8009/Kit
- FL8018/Kit
- FL8040/Kit
- FL8060/Kit

Specifications

FL8060



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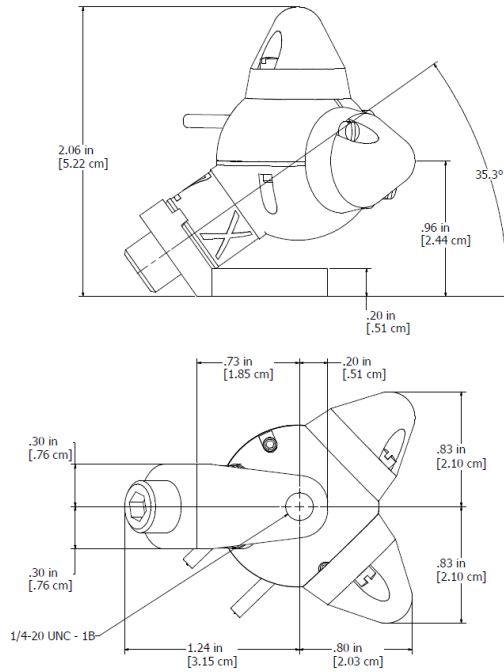


FL8000 Series

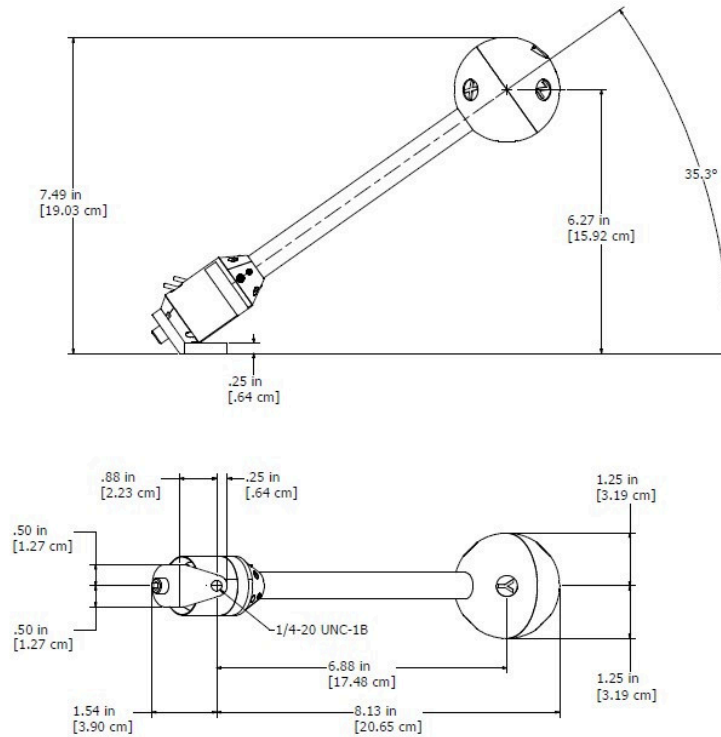
Field Probe Kits:

- FL8200/Kit
- FL8009/Kit
- FL8018/Kit
- FL8040/Kit
- FL8060/Kit

Envelope Drawing FL8200/FL8009



Envelope Drawing FL8018/ FL8040/ FL8060



FL8000 Series

Field Probe Kits:

- FL8200/Kit
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- FL8040/Kit
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Specifications

FI8000

The FI8000 interface provides both power to and communication with the FL8000 series probes. A low-level loop back fiber optic connection is used to sense unexpected disconnect of laser driven fibers to ensure user-safe operation. As an additional safety measure, shuttered connectors are used on all fiber optic connections to and from the probe.


The FI8000 can be used with the FM7004A Field Monitor (using the provided 0.5 meter fiber optic cable) or a PC by direct communication using the USB, GPIB, Ethernet or RS-232 interfaces.

The FI8000 is housed in a 19" wide by 3.5" (2U) high instrument case with a 1.75 (1U) high blank panel.



PC Interfaces	IEEE-488 (GPIB) Ethernet USB 2.0. Test and Measurement Class RS-232 (19200 Baud) Fiber-Optic Serial (19200 Baud)
F/O Connector Type	E-2000 Compact Duplex
Application Software	VM7000, emcware
Laser	
Wavelength	808 nm
Maximum Output Power	2000 mW
Class	1
Shutdown Time	<1 ms After fiber disconnect <250 ms After loss of communication
Power Requirements	
Input Voltage	90 - 260 VAC, 50 - 60 Hz
Input Current	0.2 - 0.6 A
Connector Type	IEC C14 Inlet with filter
Ambient Temperature	10° - 40° C
Enclosure	2U Desktop Case with 1U Blank panel installed
Weight	2.3 kg (5.0 lb) without enclosure 6.8 kg (15 lb) with enclosure
Dimensions (W x H x D)	48.3 x 4.4 x 26.9 cm (19.00 x 1.72 x 10.60 in) without enclosure 50.4 x 11.6 x 30.5 cm (19.84 x 4.58 x 12.00 in) with enclosure

Compatibility Matrix		
	FI7000	FI8000
FA7006/Kit		
FA7218/Kit		
FA7040/Kit		
FA7060/Kit		
FL7030	✓	✓
FL7004	✓	✓
FL7006	✓	✓
FL7018	✓	✓
FL7040	✓	✓
FL7060	✓	✓
FL7004	✓	✓
FL8200		✓
FL8009		✓
FL8018		✓
FL8040		✓
FL8060		✓



CLASS 1
LASER PRODUCT
IEC 60825-1:2014

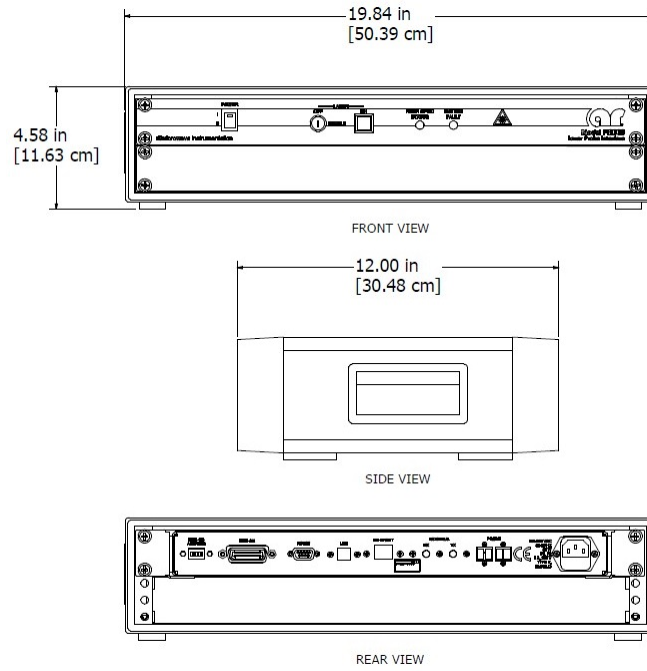
**Complies with 21CFR 1040.10 and 1040.11
except for deviations pursuant
to Laser Notice # 50,
dated June 24, 2007**

FL8000 Series

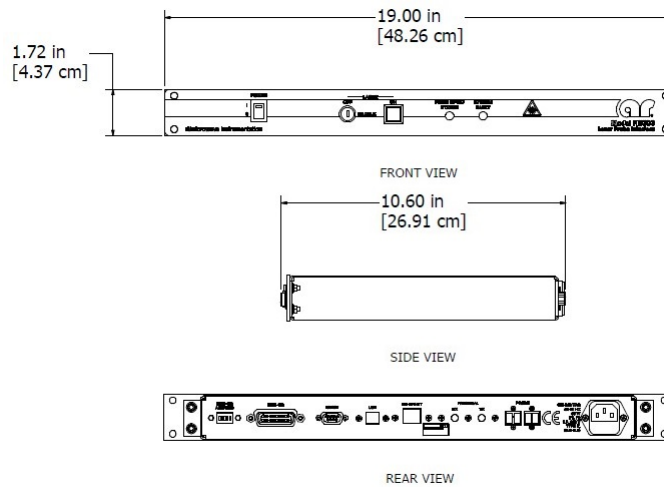
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Envelope Drawing FI8000



Envelope Drawing FI8000M1



FL8000 Series

Field Probe Kits:

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- FL8060/Kit

Regulatory Compliance	
Type	Standard
CE	EN 61326-1
	EN 61010-1
	Directive 2011/65/EU
	Directive (EU) 2015/863
	Directive (EU) 2017/2102
	Directive 2012/19/EU
Safety	Regulation (EC) 1907/2006
	UL 61010-1
Export	CAN/CSA C22.2 #61010-1
	EAR99

Ordering Information

Model	FL8200 Field Probe 5 kHz – 200 MHz	FL8009 Field Probe 20 MHz – 9.3 GHz	FL8018 Field Probe 20 MHz – 18 GHz	FL8040 Field Probe 20 MHz – 40 GHz	FL8060 Field Probe 20 MHz – 60 GHz	Accredited ISO 17025 Calibration	Carrying Case	F1800 Laser Probe Interface*	0.5 m F/O Jumper Cable	20 m F/O Extension Cable Set	F/O Mating Adapter Set	Miniature Tripod
FL8200/Kit	✓					✓	✓	✓	✓	✓	✓	✓
FL8009/Kit		✓				✓	✓	✓	✓	✓	✓	✓
FL8018/Kit			✓			✓	✓	✓	✓	✓	✓	✓
FL8040/Kit				✓		✓	✓	✓	✓	✓	✓	✓
FL8060/Kit					✓	✓	✓	✓	✓	✓	✓	✓
FL8200	✓					✓	✓					
FL8009		✓				✓	✓					
FL8018			✓			✓	✓					
FL8040				✓		✓	✓					
FL8060					✓	✓	✓					
F18000								✓	✓			

*Add an M1 to the end of the Model Number to order without an instrument case for the F18000.

Compatible Accessories

Model	Description
FLCC	Custom calibration for FL8000 Series Field Probes and Field Probe Kits (user-specified calibration requirements must be provided using AR Form 647 at the time of quote)
FM7004A	Field Monitor
FC7010	10 meter fiber optic cable
FC7020	20 meter fiber optic cable
FC7050	50 meter fiber optic cable
FC7100	100 meter fiber optic cable
MA7000	Fiber optic mating adapter
FF7000	Mounting fixture for performing tests found in standard FMC 1278

The FM7004A Field Monitor can be combined with one or more Field Probe Kits in a single package. Please see MP Series Specification for more details on Monitor Packages.