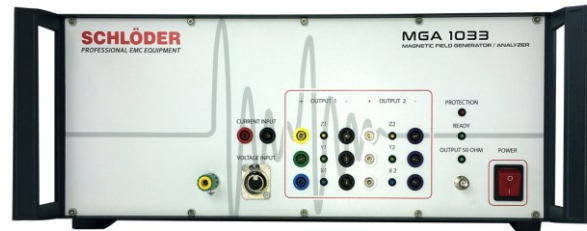


MGA 1033

Magnetic Field Generator - Analyzer

IEC / EN 61000-4-8, ISO 11452-8
MIL-STD-461, IEC / EN 55103-1/2 a. o.

- Magnetic field tests and measurement DC to 250 kHz
- Complies to all relevant EMC, automotive and military standards
- Magnetic field strength up to 1000 A/m at 1000 Hz
- Fully automated tests with optional triaxial Helmholtz coil.



With self-calibration!
Integrated spectrum analyzer!

Overview

The MGA 1033 is a compact test system for generating and measuring magnetic fields in the frequency range from DC to 250 kHz. The integrated high-power amplifier allows the high field strengths required by numerous military and automotive standards to be easily achieved.

In combination with the triaxial Helmholtz coil MGA HCST 50-28, field strengths of 1000 A/m can be generated in the frequency range from DC to 1 kHz. The test is extremely convenient: due to the triaxial design, the fields are generated fully automatically in all three spatial axes - the test object no longer needs to be rotated.

The MGA 1033 consists of three main modules:

- Signal generator (DC - 250 kHz)
- Power amplifier (800 W output power, DC - 1 MHz bandwidth)
- Spectrum analyzer (16 bit, 1 MS/s sampling rate)

All modules can be used like single units. Although originally developed for the measurement and generation of magnetic fields, the MGA 1033 can be used for a wide range of measurement and testing applications.

Key facts

- Consisting of the following modules: signal generator (DC - 250 kHz), power amplifier (800 W output power, DC - 1 MHz bandwidth) and spectrum analyzer (16 bit, 1 MS/s sampling rate)
- **Tests with magnetic field requirements for the following standards:** ISO 11452-8, MIL-STD-461, IEC/EN 55103-1/2, IEC/EN 61000-4-8, SAE J1113-2, SAE J1113-22, Ford ES-XW7T-1A278-AC, PSA B217110, Renault 36-00-808, DC-11224, DC-10614 and similar standards.
- Measurements and tests according to the following **standards** additionally implemented **in the application software:** MIL-STD-461 (CE101, CS101, CS109), EN 61000-4-16 and IEC / EN 61543
- **Application software** for Microsoft Windows with preset parameters/limit values, transfer of own routines possible, data transfer from external multimeter via serial port
- Extensive range of accessories: coils, adapters, coupling devices



Sales Partner:

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MGA 1033

Magnetic Field Generator - Analyzer





Technical data	
Analyzer	
Voltage input (Analyzer)	
Frequency range	DC - 250 kHz
Input impedance	1 M Ω / 50 Ω switchable
Connector	XLR, unbalanced (1 ground, 2 +, 3-)
Max. input voltage	100 V continuous (attenuator autoselected at overvoltage); 10 V at 50 Ω
Gain	-20/0/20/40 dB preamplifier 0/20 dB ADC amplifier self-calibration with ultra stable on-board reference
Current input	
Frequency range	DC - 250 kHz
Shunts	10 m Ω / 1 Ω / 100 Ω
Max. input current	20 A continuous (overload protection) 1 Ω and 100 Ω shunt are protected additionally by an 1.5 A fuse
Connector	4 mm safety jack (+, -)
Measurement range	20 A, 10 A, 1 A, 100 mA, 10 mA, 1 mA automatic offset and gain self-calibration with ultra stable on-board reference
AD-converter	
Resolution	16 Bit
Sampling rate	1.0 MS/s
Aliasing filter (filter may be switched off)	0.01dB Tschebyscheff filter, fg = 260 kHz;
Generator	
Frequency range	DC - 250 kHz
Output impedance	50 Ω
Connector	BNC, unbalanced
Signal	sine wave / square wave / triangular / DC
Amplitude	0 – 10V AC, -10V - +10V DC
Resolution	12 Bit (2.5 mV) switchable -20 dB attenuator Self-calibration with ultra stable on-board reference
Amplifier	
Frequency range	DC – 1 MHz
Connector	4 mm safety jacks (output) BNC, unbalanced (input)
Current	16 Arms
Voltage	50 V _{rms} / 75 V _{DC}
Distortion (DC – 100 kHz, load \geq 4 Ohm)	< 0.10 %
Voltage amplification	10 \pm 0.1 % (\pm 0.01 % / $^{\circ}$ C)
General data	
EUT control / Connector	9-pin Sub-D; RS-232
Connection to computer	USB
Temperature range	0 to 40 $^{\circ}$ C
Warm-up time	15 min
Housing	19" subrack or desktop case
Mains voltage	115 / 230 VAC \pm 10%, 50-60 Hz
Dimensions (W x H x D)	449 mm x 177 mm x 580 mm
Weight (shipping)	approx. 40 kg (net 34 kg)



MGA 1033

Magnetic Field Generator - Analyzer

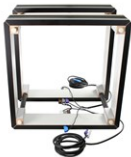



Options	
Loop sensor/ radiating loops	Field loops are required to generate magnetic fields. Magnetic fields are measured with sensor loops. The loops are manufactured according to the definitions in MIL-STD 461 and EN 55103.
Helmholtz coil	Helmholtz coils are the ideal instruments for generating homogeneous magnetic fields. The models HCS 50-28 and HCST 50-28 generate field strengths from 1000 A/m to 1 kHz. The MGA 1033 with the optional compensation board is required for this.
Coupling transformer	A coupling transformer is used for testing for conducted immunity on power lines according to MIL-STD-461, CS 101. Due to the high common-mode voltage on the mains side, a differential amplifier is built into the coupling transformer, which enables simple measurement of the coupled differential voltage.
Testing equipment acc. to EN 55103-2	Annex B of EN 55103-2 describes various test adapters intended for immunity tests from 50 Hz to 10 kHz.

Technical data	Options: loop sensor / radiating loops			
Article	Loop sensor LS 040	Radiating loop RL 120 (RL 120-80)	Loop sensor LS 133	Loop sensor- / radiating loop RLS 133
				
Diameter	40 mm	120 mm (200 mm)	133 mm	133 mm
Shielding	elektrostatic	-	elektrostatic	elektrostatic
Cable connector	XLR	4 mm MC plug	XLR	XLR / 4 mm MC plug
Coil factor (50 mm)	---	76,3 1/m	---	138,5 1/m
Correction factor	see calibration sheet (50 Ω / 600 Ω / 1MΩ)	---	see calibration sheet (50 Ω / 600 Ω / 1 MΩ)	see calibration sheet (50 Ω / 600 Ω / 1 MΩ)
Rated current	---	16 A	---	5 A
Connection cable	microphone cable	litz wire 2 x 1.5 mm ²	microphone cable	microphone cable / litz wire 2 x 1.5 mm ²

MGA 1033




Magnetic Field Generator - Analyzer

Technical data* Options: Helmholtz coils

Helmholtz coils MGA	HCS 50-28	HCS 100-60	HCS 125-75	HCST 50-28
				
Number of axes	1	1	1	3
Dimensions [cm]	50 cm	100 cm	125 cm	50 / 46 / 42 cm
Number of turns (per coil)	26 + 4	44 + 10	40 + 10	26 + 4
Coil distance [cm]	28	60	75	28
Coil factor [m ⁻¹] (typical)	65.9 / 11.2	62.1/ 13.4	47.5 / 10.3	X-axis: 66.1/11.3 Y-axis: 67.8/11.8 Z-axis: 69.1/12.2
DC resistance (typical)	0.63 / 0.15 Ω	2.27 / 0.43 Ω	9.8 / 2.0 Ω	X-axis: 0.58/0.10 Ω Y-axis: 0.53/0.09 Ω Z-axis: 0.48/0.08 Ω
Inductance (typical)	1.73 / 0.07 mH	15.8 / 0.65 mH	16.4 / 1.0 mH	X-axis: 1.73/0.07 mH Y-axis: 1.52/0.06 mH Z-axis: 1.33/0.05 mH
Resonant frequency	> 700 kHz	> 150 kHz	> 150 kHz	> 700 kHz
Continuous/ short-time current	16 / 20 A	16 / 20 A	5 / 7 A	16 / 20 A

* For further data, please refer to the technical data sheet for "Helmholtz coils"

Technical data Options: adapter, calibration network, current transducer, EN 55103-2

Article	Common mode test adapter MGA B1 EN 55103-2	Calibration network MGA B2 EN 55103-2	Current transducer MGA B4 EN 55103-2
			
Connectors	Generator in: BNC Output: XLR male	Input: XLR female Output: XLR male	Audio in: 4 mm MC safety jacket Input: XLR female Output: XLR male

MGA 1033

Magnetic Field Generator - Analyzer

Technical data

Options: coupling transformer

*Coupling transformer MGA CT-50A
with differential amplifier*



Coupling transformer MGA CT-50A

Primary windings

Inductance	~ 4 mH (unloaded)
Rated current	16 A
Input voltage (saturation)	15 Hz: > 12,5 Veff 30 Hz: > 25 Veff
Connectors	safety panel receptacle Ø 4 mm

Secondary windings

Inductance	> 2 mH (unloaded)
Saturation	50 A (AC or DC)
Connectors	high current plug Ø 6 mm (< 50 A) with integrated Ø 4 mm socket (< 32 A)
Secondary side (monitor)	0.1 A, BNC
Precision resistance	0,5 Ohm, 1%, 100 W active cooling

Differential amplifier

Frequency range	DC - 700 kHz (small signal) / DC - 200 kHz (full power)
CMRR	> 60 dB (400 Hz)
Noise	< 6.5 mVrms (DC - 2 MHz)
Output	20 Vpp / 10 mA

General data

Frequency range	15 Hz - 250 kHz
Turns ratio	2 : 1 (step down)
Precision resistor	0.5 Ohm, 1 %, 100 W, active cooling
Case	19" desktop case (cabinet mounting optional)
Dimensions (W x H x D)	480 mm x 180 mm x 315 mm
Weight	approx. 13,5 kg



Sales Partner:

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MGA 1033

Magnetic Field Generator - Analyzer

Options	
MGA 1033	Generator/analyzer for magnetic field tests/measurements according to ISO 11452-8, EN 55103-1/2, MIL-STD-461 and similar standards frequency range: DC - 250 kHz; amplifier: 50 V / 16 A; scope of delivery: power cable, USB cable, system software Windows® 8 / 10
MGA 1032	Option: compensation board for MGA 1033; for compensation of the coil inductance of MGA HCS 50-28 TAP and MGA HCST 50-28 TAP (for field strengths up to 1000 A/m up to 1000 Hz)
MGA LS 040	40 mm coil to MIL-STD-461 (RE101) ; incl. cable, 3 m
MGA RL 120	120 mm coil to MIL-STD-461 (RS101) ; incl. cable, 3 m
MGA LS 133	133 mm coil to MIL-STD-461 (RE101) ; incl. cable, 3 m
MGA RLS 133	133 mm coil according to EN 55103 ; incl. cable set
MGA HCS 125-75	Helmholtz coil with centre tap; for tests according to MIL-STD-461, EN 55103-2, SAE J1113-22 and others ; frame length 125 x 125 cm, distance 75 cm; incl. cable set, 3 m
MGA HCS 100-60	Helmholtz coil 1 axis 1.00 x 1.00 m, for tests according to MIL-STD-461, EN 55103-2, SAE J1113-22 and others , distance 0.60 m, incl. cable set, 3 m
MGA HCS 50-28	Helmholtz coil with centre tap; for tests according to MIL-STD-461, EN 55103-2, SAE J1113-22 and others ; frame length 0.5 x 0.5m, distance 0.28 m; incl. cable set, 3 m
MGA HCR 50-25	Helmholtz coil for direct current, 1-axis, for tests according to MIL-STD-461, EN 55103-2, SAE J1113-22 and others int. Ø 0.44 m, distance 0.25 m, incl. cable set, 3 m
MGA HCST 50-28	Triaxial Helmholtz coil with center tap; for tests according to MIL-STD-461, EN 55103-2, SAE J1113-22 and others ; continuous current: 16 A, Size: 50 cm x 46 cm x 42 cm, incl. cable set, 3 m
MGA CT 50A	Coupling transformer for tests according to MIL-STD-461 / CS101 ; in connection with MGA 1033; contains resistance 0.5 Ohm / 100 W (actively cooled) and differential amplifier; Incl. power supply and cabling
MGA ISS-19	Coupling device for tests according to DO-160 , Section 19 (19.3.1, 19.3.2, 19.3.3) in connection with MGA 1033; incl. power supply and cabling
MGA B1	Test adapter according to EN 55103-2
MGA B2	Calibration network according to EN 55103-2
MGA B4	Current transformer with matching network according to EN 55103-2
MGA SO_CE101	Software upgrade MIL-STD-461 / CE101
MGA SO_CS101	Software upgrade MIL-STD-461 / CS101
MGA SO_CS109	Software upgrade MIL-STD-461 / CS109
MGA SO_4_16	Software upgrade EN 61000-4-16
	Coupling networks & accessories for tests according to EN 61000-4-16 , please request separate data sheet!

All information regarding appearance and technical data correspond to the current state of development at the time of release of this data sheet. We reserve the right to make technical changes. 292111