Mag648 and Mag649

Low Power Three-Axis Magnetic Field Sensors

Innovation in Magnetic Field Measuring Instruments

Bartington® Instruments

Mag648 and Mag649
Low Power Three-Axis Magnetic Field Sensors

This range of three-axis fluxgate sensors offer sensitive low noise magnetic field measurements together with exceptionally low power consumption. Their compact size and battery powered operation make these sensors ideal for surveillance and perimeter security applications.

Features and options

- Bandwidth to 30Hz (Mag648) and 1kHz (Mag649)
- Standard, submersible and unpackaged versions available
- Low power: from 15mW consumption
- Low noise version: <10pTrms/√Hz at 1Hz
- Measuring range: ±60µT or ±100µT

Typical applications

- Vehicle monitoring
- Perimeter surveillance
- Magnetic field measurement in remote locations
- Multi-sensor magnetic signature ranges

Product identification

Product name	Package	Noise	Range
Mag648 or Mag649	*No code* = Standard MX = Molex connector FL = Flying lead S = Submersible U = Unpackaged	*No code* = Standard noise L = Low noise	60 = 60µT 100 = 100µT

Example: Mag648-MXL100 is a low noise 100µT sensor with a Molex connector.

Mag648 and Mag649 Specifications

Performance	
Number of axes	Three (Right Hand XYZ co-ordinate system)
Polarity	+ve non-inverting output when pointing North
Measuring range	±60µT or ±100µT
Bandwidth at-3dB: Mag648 Mag649	>30Hz >1kHz
Internal noise: low noise standard noise	⩽10pTrms/√Hz at 1Hz Between 10 and 20pTrms/√Hz at 1Hz
Scaling	50mV/µT (60µT) or 30mV/µT (100µT)
Start-up time	150ms
Warm-up time	15mins
Offset error	±100nT in zero field
Scaling error	±0.5% at DC
Temperature coefficient of offset error	1nT/°C
Temperature coefficient of scale factor	100ppm/°C
Orthogonality error	Less than 1° error between axes
Linearity error	0.0033% (least squares fit)
Frequency response (<5% deviation from DC): Mag648 Mag649	DC – 5Hz DC – 100Hz
Hysteresis	<2nT at 1 x full scale (when powered)
Excitation breakthrough: Mag648 Mag649	<10mV pk-pk at 4kHz <10mV pk-pk at 8kHz
MTBF	~21 years per MIL-217F-2(GB)

Environmental	
Operating temperature range	-40°C to +70°C
Storage temperature range	-55°C to +125°C
Environmental protection: Mag648/649 Mag648-MX & FL/Mag649-MX & FL Mag648S/Mag649S	 IP67 enclosure IP67; connector none IP68 (2000m depth)

Mechanical

	Mag648 **Mag649**	**Mag648-MX** **Mag649-MX**	**Mag648FL** **Mag649FL**	**Mag648S** **Mag649S**	**Mag648U** **Mag649U**
Dimensions (excl. cable) (W x H x L)	30 x 32 x 70mm			40 x 40 x 115mm	29 x 23 x 66mm
Interconnecting cable length	200mm	135mm	500mm	N/A	
Weight (approximate)	120g			300g	20g
Enclosure material	Black acetal filled with polyurethane resin UR5097			Acetal	N/A
Connector	Binder 99 9125 00 08	Molex 22-04-1103	N/A	Impulse XSJ-9-BCR	Molex 53047-1010
Mating connector	Binder 99 9126 00 08	Molex 22-04-1101	N/A	XSJ-9-CCP	Molex 51021-1000 + contacts
Cable bending radius	41mm			110mm	N/A
Mounting	3 x ø4.5mm holes			2 x ø4.5mm holes	Single hole M2.5

Electrical

Supply voltage	+3.5V to 15V
Current consumption: Mag648 Mag649	3.6mA (typical earth field), 4mA max. 5.2mA (typical earth field), 5.5mA max.
Power-on surge	400mA maximum
Analogue outputs – full-scale voltages	±3V (balanced differential, each output 0.15V to 3.15V, 1.65V zero-field)
Output impedance	20Ω typical
Maximum load capacitance: Mag648 Mag649	> 10µF bandwidth reduces when load capacitance > 1µF
Maximum cable length	1.5km (must achieve 3.5V at supply voltage pin of Mag648/649)
Cable resistivity: Mag648/649 Mag648-MX & FL/Mag649-MX & FL Mag648S/Mag649S	92Ω/km 92Ω/km 39Ω/km

Outline drawings of these sensors are available on their product page on the Bartington Instruments website.

Accessories

	Mag648 & Mag649	Mag648-MX & Mag649-MX	Mag648FL & Mag649FL	Mag648S & Mag649S	Mag648U & Mag649U
Cables	Optional extra	Optional extra	N/A	Optional extra	Optional extra
Mating connectors	Free of charge	Not supplied	N/A	Optional extra	Not supplied
Mounting	Mounting plate for mounting on Tripod and Tripod Adaptor [optional extra]			N/A	N/A

Product compatibility

- PSU1 Power Supply Unit
- Magmeter
- SCU1 Signal Conditioning Unit
- Decaport Analogue Interface Module
- DAS1 Data Acquisition System
- DecaPSU

DS2298/22

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