

Differential Magnetostrictive Sensor CY-DMR-03

Features

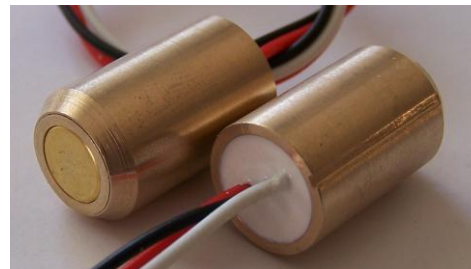
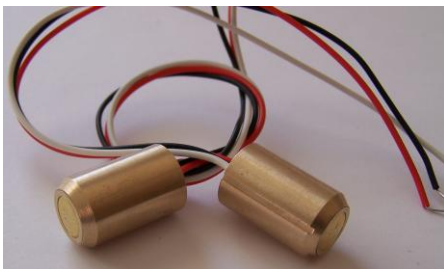
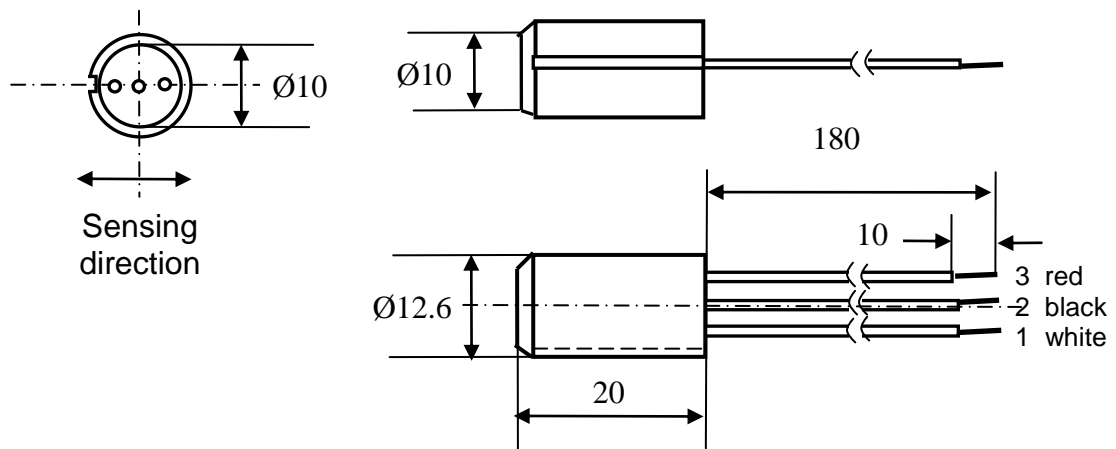
- Sensing over wide rotation speed range (0~100kHz)
- Robust metallic or plastic housing
- Signal amplitude is speed independent
- Biasing magnet built in
- Best suited for harsh environments

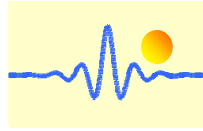
Typical applications

- Rotation speed detection
- Rotation position detection
- Proximity Switch
- Angle encoder
- Linear position sensing

The differential magnetostrictive sensor CY-DMR-03 consists of two series coupled magneto resistors (D-type InSb/NiSb semiconductor resistors whose value can be magnetically controlled), which are mounted onto an insulated ferrite substrate. The sensor is encapsulated in a metallic package and has 3 connection terminals. The basic resistance of the total system is $2 \times 250\Omega$. A permanent magnet, which supplies a biasing magnetic field, is fixed on the base of the sensor.

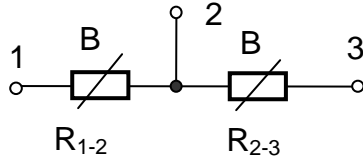
Sensor Outline





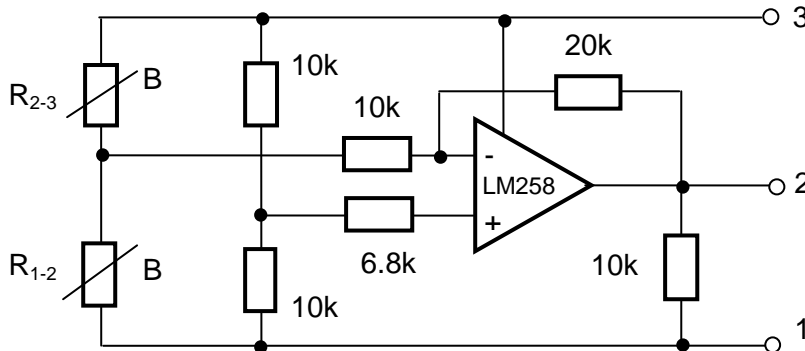
Sensor Circuits

a) Without Amplifier



3: V+ power supply (+5V),
2: V_{out} Output signal,
1: GND

b) Built-In Inner Amplifier



3: V+ (+5V),
2: V_{out} Output signal,
1: GND

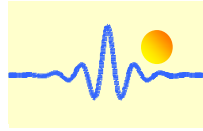
Specifications

Part numbers	CY-DMR-03A	CY-DMR-03B
Built-in Inner amplifier	no	yes
Maximum power supply V _{max}	10V DC	5.5V DC
Nominal power supply	5V DC	5V DC
Inner total resistance R ₁₋₃ (δ=∞, I≤mA, t=25°C)	700 Ω – 1500 Ω	700 Ω – 1500 Ω
Center symmetry M=100% (R ₁₋₂ -R ₂₋₃)/R ₁₋₂ (δ=∞)	≤10%	≤10%
Offset voltage (at V _{in} and δ=∞)	≤ 130mV	≤ 130mV
Open circuit output voltage V _{out pp} (at V _{in} and δ=0.15mm)	≥1100mV	3500mV
Frequency range	0-100kHz	0-100kHz
Operating temperature	-20°C ~ +80°C	-20°C ~ +80°C
Storage temperature	-40°C ~ +85°C	-40°C ~ +85°C

Standard target object: 1.8x5x4mm (1.8x5mm face moves in the sensing direction of the sensor).

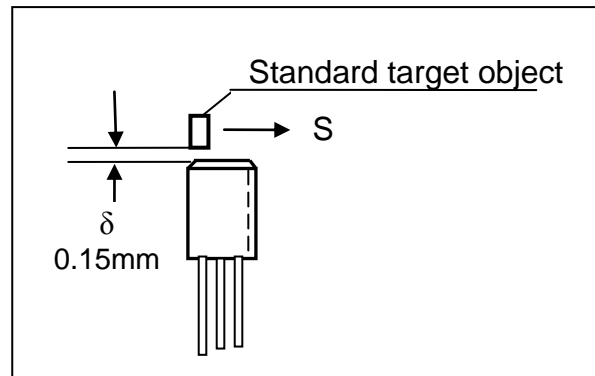
Cross Reference

Part number	Cross reference
CY-DMR-03A	MuRata FR05CM21AR
CY-DMR-03B	---

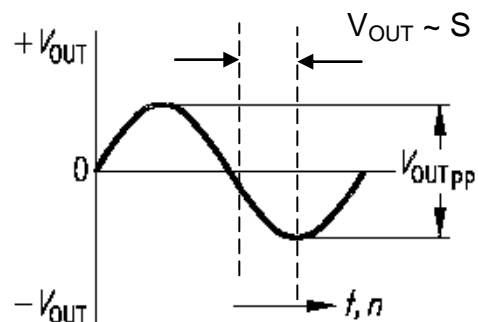
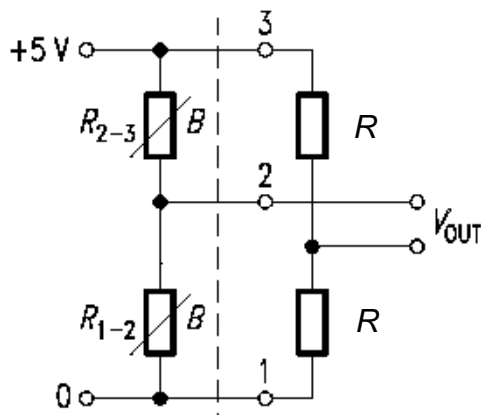


Measurement Arrangement

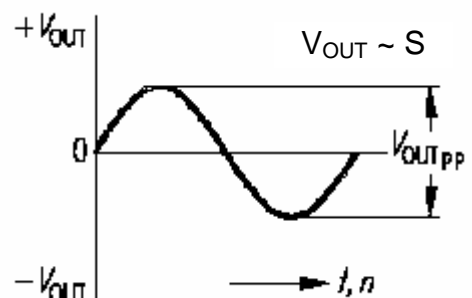
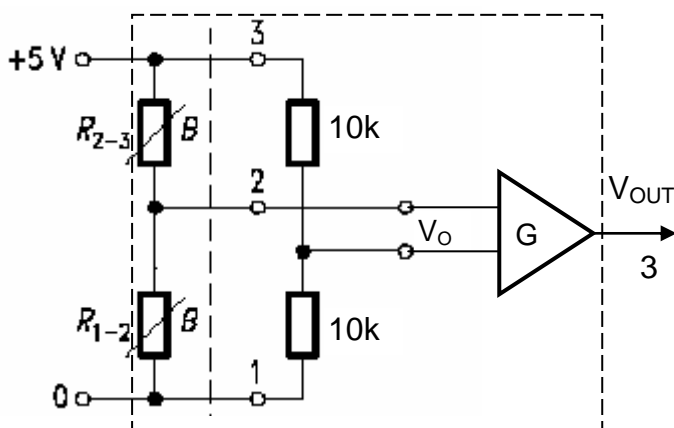
A measuring bridge is used for applications of the magnetoresistive sensor CY-DMR-03. The resistance of the sensor is changed by approaching a small soft iron part (standard target object) close to it. As result an output voltage change of measuring bridge is caused by the resistance change (see below).



Sensor CY-DMR-03A



Sensor CY-DMR-03B



To convert small distance into a proportional electric signal, one can use a small soft iron part with definite width (e.g. $b=1.8\text{mm}$) to move over the face of the sensor. A linear signal up to 1.5mm can be obtained in this way. The sinusoidal signal gives a voltage output proportional to the distance in the zero crossover region.