INSTRUMENT DATA SHEET

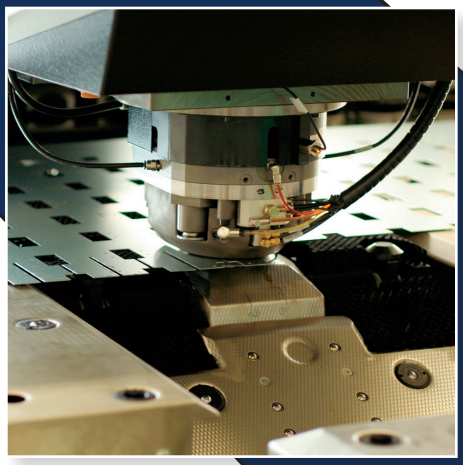


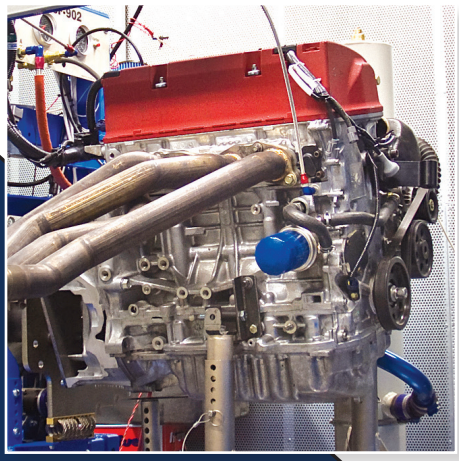
KD-2446

Non-contact high-precision proximity measuring system









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KMM
PRECISION MEASURING

KD-2446

KMM PRECISION MEASURING

Features

- Outstanding precision: static resolution to 12 microinches
- Low cost
- Excellent performance with ferrous targets
- Variable voltage input from 12 to 24 volts DC
- Compact rugged electronics, sensors
- Adjustable gain for up to 22 volts output (with 24 Vdc input)
- Temperature tolerant sensors (to 400°F)
- High speed, 10KHz analog output, 3.3KHz switched output for process control
- Very low switching hysteresis, < 1% on ferrous targets
- RoHS compliant

KMM's Model KD-2446 is a noncontact proximity measuring system. This low-cost, easy-to-use system makes precision static and dynamic measurements of metal targets.

Theory of operation

The KD-2446 system operates on a traditional Colpitts oscillator circuit where the sensor acts as the resonating coil for the oscillator. The proximity of the target to the sensor face pulls the oscillator, changing its frequency and amplitude of modulation, and controlling a variable gain oscillator section within the electronic circuit.

The signal is half-wave rectified and filtered to obtain an analog voltage proportional to the target position or displacement. The analog voltage output can be varied by adjustment of the gain. The input power is diode protected and regulated to provide a clean low-noise signal. The output is short-circuit current protected.

Applications

The KD-2446 may be used in a variety of applications using target materials such as ferrous steel, stainless steel or aluminum. Applications include displacement, vibration, sorting and event capture. With its excellent sensitivity to small targets and high-speed switching, the KD-2446 is ideal for RPM sensing in harsh environments. The opto-isolated switched output makes the KD-2446 ideal for interfacing to PLC inputs, counters, timers or alarm circuits.

KD-2446 System

The KD-2446 system consists of two subassemblies: the sensor, with integral cable, and the signal conditioning or electronics module. The KD-2446 electronics is housed in a DIN rail mount enclosure with terminal connections for +12 Vdc to +24 Vdc input power and the variable voltage and switched outputs. KMM offers either the P-3410 or P-3450 power supplies. The system comes standard with one of two production sensor configurations — the 9C or the 5CM. Both of these sensors are rated for continuous operation up to 400°F (205°C).

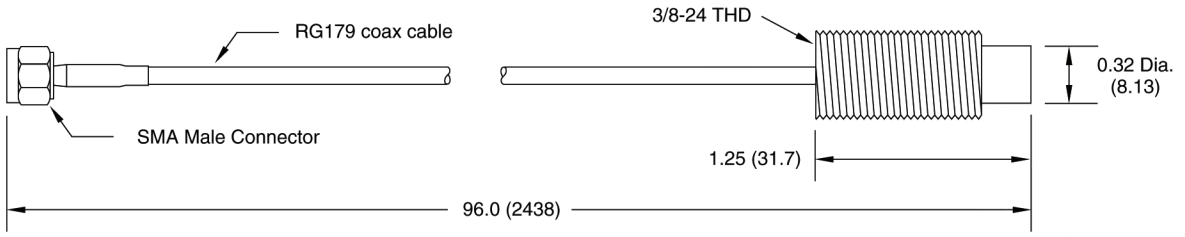
EMI Performance

The KD-2446 conforms with the applicable standards of Council Directive for Generic for Light Industrial and Commercial Use. Under some EMI environments, at specific frequencies, the KD-2446 unit may experience a change in output voltage. In general, when exposed to those environments covered by the EMC directive, the user can expect less than 5% deviation of output. As always contact KMM Precision Measuring for specific data or for recommended solutions to problems you are having with the KD-2446.

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KD-2446 Sensors

9C SENSOR AND SPECIFICATIONS



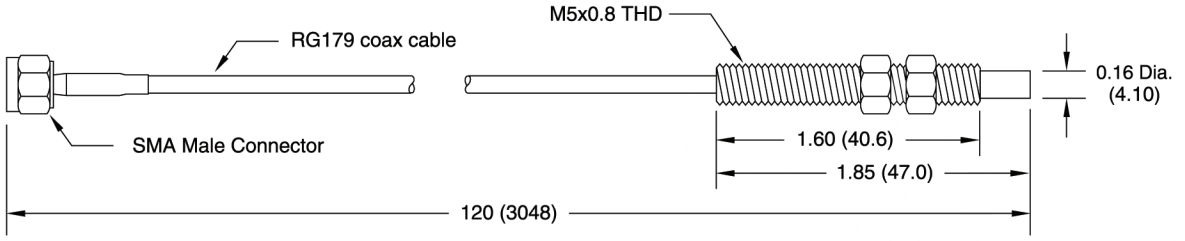
Dimensions shown are in inches (mm)

ORDERING INFORMATION

KD-2446-9C	Complete system, sensor and electronics	P/N 855776-9CMT
	Sensor only	P/N 851166-008
	Electronics only	P/N 855765-001G

TARGET MATERIAL	9C SENSOR MEASURING RANGE
Non-ferrous (aluminum)	0 - 0.175 in. (0 - 4.45 mm)
Non-magnetic steels (304 stainless)	0.025 - 0.200 in. (0.64 - 5.08 mm)
Magnetic steels (4130)	0.040 - 0.275 in. (1.02 - 6.99 mm)

5CM SENSOR AND SPECIFICATIONS



Dimensions shown are in inches (mm)

ORDERING INFORMATION

KD-2446-5CM	Complete system, sensor and electronics	P/N 855776-5CM
	Sensor only	P/N 851520-004
	Electronics only	P/N 855765-001G

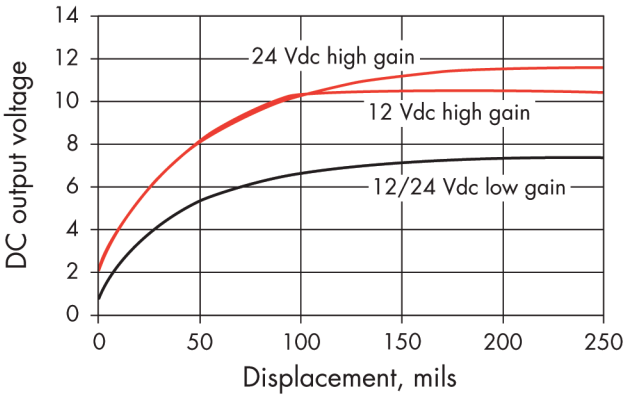
TARGET MATERIAL	5CM SENSOR MEASURING RANGE
Non-ferrous (aluminum)	0 - 0.100 in. (0 - 2.54 mm)
Non-magnetic steels (304 stainless)	0.010 - 0.125 in. (0.254 - 3.18 mm)
Magnetic steels (4130)	0.015 - 0.150 in. (0.38 - 3.81 mm)

KMM PRECISION MEASURING

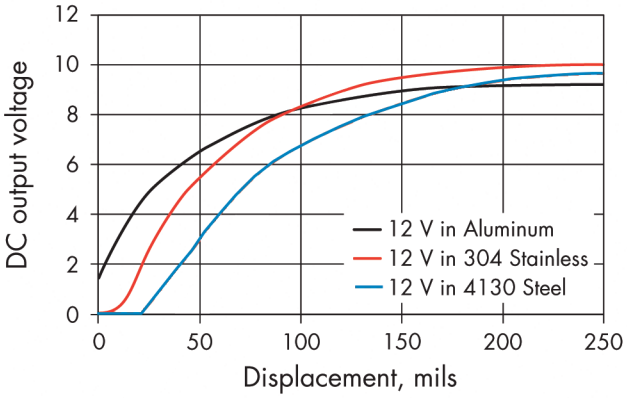
KD-2446 Sensors

9C SENSOR RESPONSE DATA

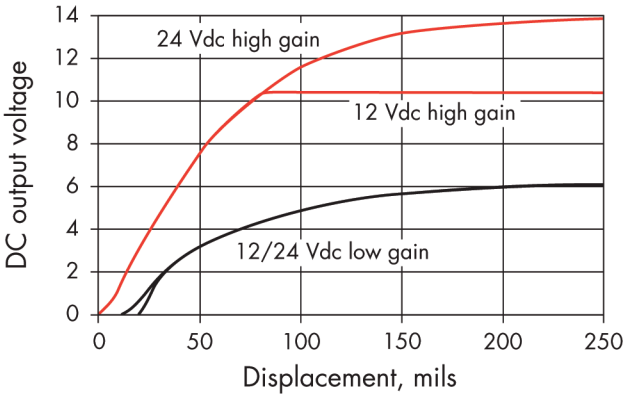
Aluminum output for 12 and 24 volt inputs



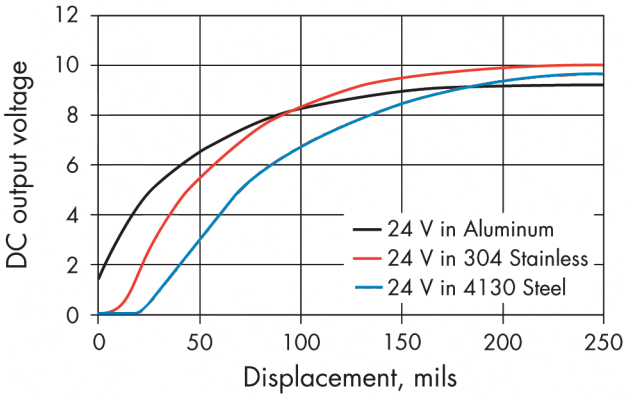
Outputs at medium gain and 12 volt input



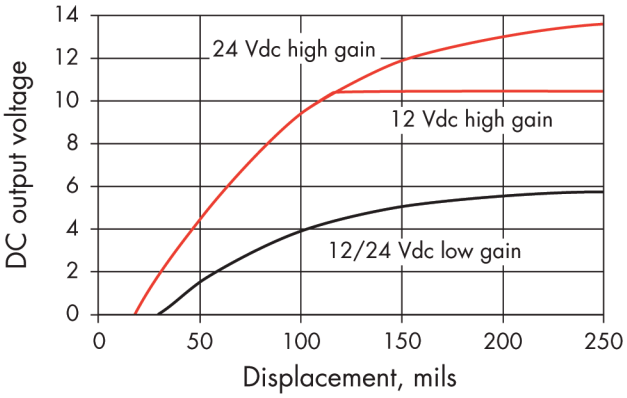
304 SS output for 12 and 24 volt inputs



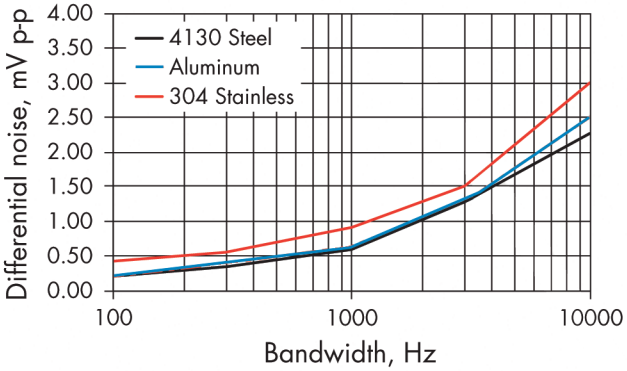
Outputs at medium gain and 24 volt input



4130 steel output for 12 and 24 volt inputs



Example output noise @ 12 Vdc input, mid gain, medium displacement

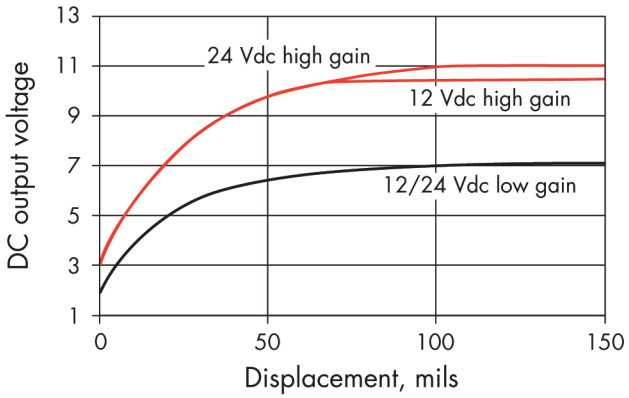


KMM PRECISION MEASURING

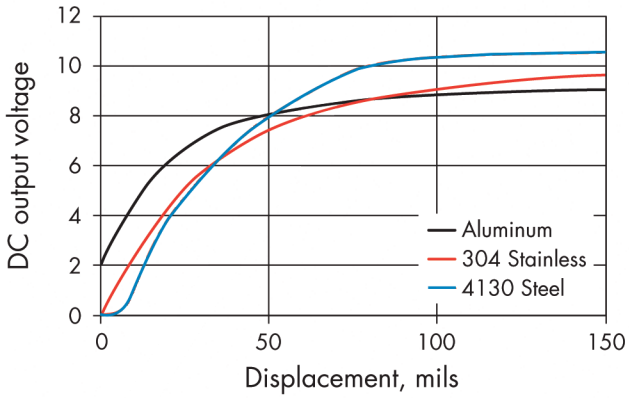
KD-2446 Sensors

5CM SENSOR RESPONSE DATA

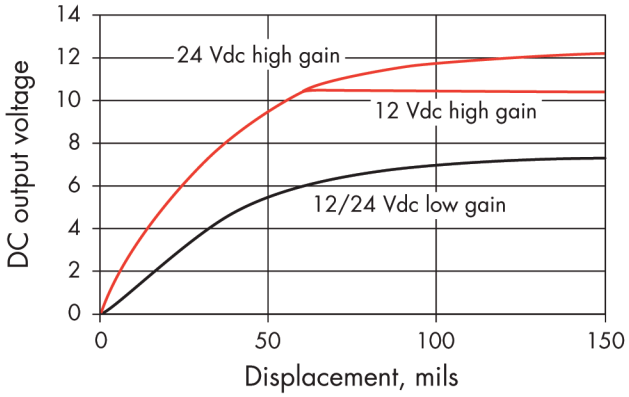
Aluminum output for 12 and 24 volt inputs



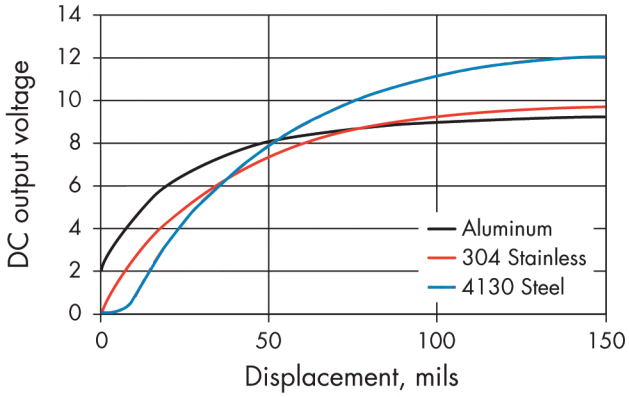
Outputs at medium gain and 12 volt input



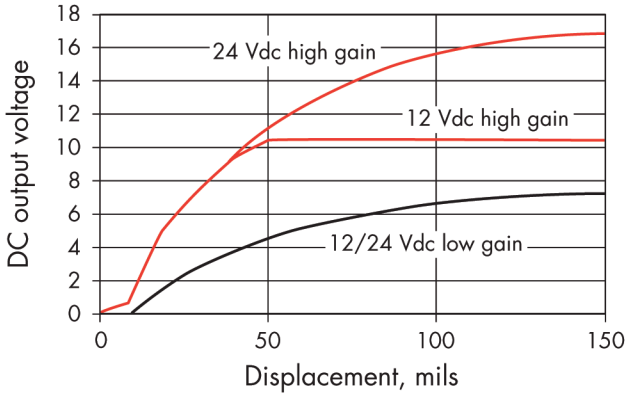
304 SS output for 12 and 24 volt inputs



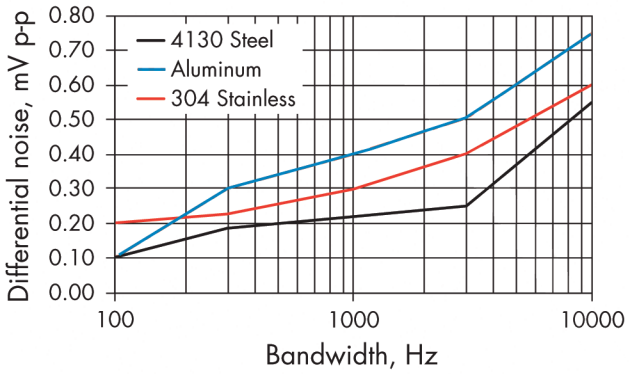
Outputs at medium gain and 24 volt input



4130 steel output for 12 and 24 volt inputs



Example output noise @ 12 Vdc input, mid gain, medium displacement



KD-2446

KMM PRECISION MEASURING

Specifications

Electrical

Input

Voltage	Regulated 12 Vdc to 24 Vdc. Fuse limit input current from power source to 11 mA, 0.28 W maximum at full load.

Analog output

Voltage	0-22 Vdc minimum with 24 Vdc input; 0-10 Vdc minimum with 12 Vdc input. The 0-22 Vdc and 0-10 Vdc are maximum voltages with the defined input voltage.
Current (full load)	4.2 mA maximum
Impedance	50 ohms
Frequency response	0-10 KHz (± 3db)

Switched output

Load current	100 mA maximum AC or DC
Load voltage	30 V r.m.s., 42.4 V peak, or 60 Vdc
On resistance	30 ohms minimum / 50 ohms maximum
Switch point hysteresis	0.56% of full scale for 9C sensor, and 0.97% of full scale for 5CM sensor using 24 Vdc input on 4130 steel
Frequency response	3.3 KHz

Resolution

Less than .008% of measuring range using a 5CM sensor on a 4130 steel target at mid scale, mid gain, and 12 Vdc input

Terminal screw torque

Maximum	7 lb-in

Environmental

Operating temperature range

Sensor and cable	0°F to +400°F (-18°C to +205°C)
Electronics	+32°F to +150°F (0°C to +66°C)

Storage temperature range

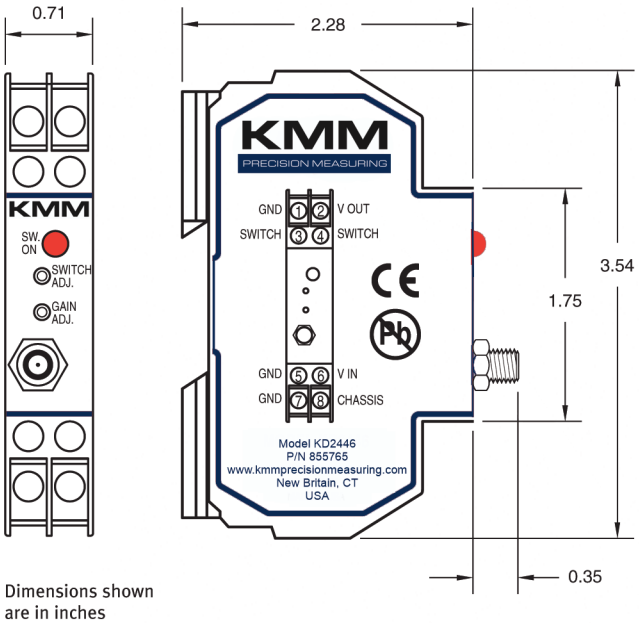
Sensor and cable	-60°F to +400°F (-52°C to +205°C)
Electronics	-58°F to +212°F (-50°C to +100°C)

Thermal drift

Less than 0.22% per °C of full scale for sensor, electronics or system

IP rating

Sensor	IP67
Electronics	IP40



Dimensions shown are in inches