KD-2446
Non-contact high-precision proximity measuring system
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

Kaman’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 sub-assemblies: 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. Kaman 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 Kaman Precision Products for specific data or for recommended solutions to problems you are having with the KD-2446.
KD-2446 Sensors

9C SENSOR AND SPECIFICATIONS

RG179 coax cable
SMA Male Connector
3/8-24 THD
0.32 Dia. (8.13)
1.25 (31.7)
96.0 (2438)

ORDERING INFORMATION
KD-2446-9C Complete system, sensor and electronics P/N 855776-9CM
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

RG179 coax cable
SMA Male Connector
M5x0.8 THD
0.16 Dia. (4.10)
1.60 (40.6)
1.85 (47.0)
120 (3048)

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)
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
KD-2446 Sensors

5CM SENSOR RESPONSE DATA

**Aluminum output for 12 and 24 volt inputs**
- 24 Vdc high gain
- 12 Vdc high gain
- 12/24 Vdc low gain

**Outputs at medium gain and 12 volt input**
- Aluminum
- 304 Stainless
- 4130 Steel

**304 SS output for 12 and 24 volt inputs**
- 24 Vdc high gain
- 12 Vdc high gain
- 12/24 Vdc low gain

**Outputs at medium gain and 24 volt input**
- Aluminum
- 304 Stainless
- 4130 Steel

**4130 steel output for 12 and 24 volt inputs**
- 24 Vdc high gain
- 12 Vdc high gain
- 12/24 Vdc low gain

**Example output noise @ 12 Vdc input, mid gain, medium displacement**
- 4130 Steel
- Aluminum
- 304 Stainless
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

**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

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The information provided herein is to the best of our knowledge true and accurate, it is provided for guidance only. All specifications are subject to change without prior notification.

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Althen stands for pioneering measurement and custom sensor solutions. In addition we offer services such as calibration, design & engineering, training and renting of measurement equipment.

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Dimensions shown are in inches