

# KD2446

## Non-contact Displacement Measuring System User's Manual

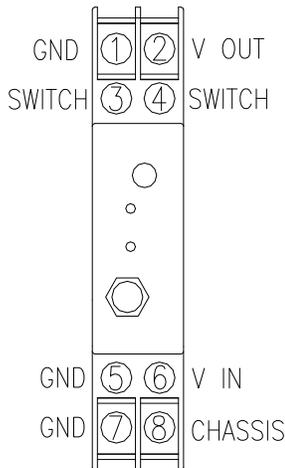
This apparatus, when installed and operated per the manufacturer's recommendations, conforms with the protection requirements of EC Council Directive 89/336/EEC on the approximation of the laws of the member states relating to Electromagnetic Compatibility. Refer to the KD-2440 Declaration of Conformity or contact Kaman Measuring Systems for details.



### Description

Displacement Measuring System Model KD-2446 is a non-contact, analog proximity measuring system. The system operates on a traditional Colpitts oscillator circuit. This low-cost, easy-to-use system can be utilized for precision static and dynamic measurements of conductive targets.

The KD-2446 system consists of two subassemblies: sensor with integrated cable, and signal conditioning electronics module. Two standard sensor configurations are available, the 9C and the 5CM. Selected performance data and dimensions for these two sensors are shown in the data sheet at [www.kamansensors.com](http://www.kamansensors.com). Additional sensor configurations are available upon request.



CONNECTIONS CHART	
Terminal	Signal
1	Gnd
2	V out
3	Switch
4	Switch
5	Gnd
6	V in
7	Gnd
8	Chassis

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## Electronics

The KD-2446 electronics module comes with standard 35mm DIN rail mounting features. The front panel has two potentiometers for adjusting the GAIN and SWITCH SET POINT levels, and an LED to indicate switch position.

KD-2446 electronics and sensors utilize SMA type coaxial connectors: female on the electronics, and male on the sensor cable. The KD-2446 electronics uses screw terminals for voltage input, analog voltage output, and switch function.

The KD2446 can be adapted to different sensors, target materials, input voltages, and measurement ranges simply by adjustment of the gain potentiometer. It contains a ten-volt internal regulator to provide a clean repeatable analog voltage output signal. Input voltage must be a regulated +12 to +24 VDC supply. Note that variations in input voltage will affect the output.

## Adjustment and Calibration

The gain (ratio of output voltage to target displacement) is used to adjust the output slope (output per displacement). Turning the potentiometer clockwise increases the gain. When changing types of target materials or power supply voltages, it will be necessary to readjust the gain for the desired output voltage. The KD-2446 can easily be adjusted or "calibrated" to obtain maximum output per displacement, maximum range, or any variation in between.

Minimum gain is defined as the lowest gain setting obtainable without pulling the circuit into saturation. Minimum gain can be obtained by setting the sensor displacement to a point within the usable range (preferably mid range), then slowly decrease the gain potentiometer until the output saturates. At this point, increase the gain slightly to a point just above saturation (the output begins to change with a gain increase).

A typical calibration is performed as follows:

1. Physically adjust the sensor to its minimum distance to the target. This is its offset distance and is the distance at which the output begins to respond, or the point at which minimum desired output is obtained.
2. Move the target to its maximum distance from the sensor, based on desired sensor range.
3. Increase the gain potentiometer until maximum desired output is obtained.
4. Move the target back to minimum distance and check output. Repeat steps 1-3 as necessary.

## Switched Output Operation

The KD-2446's switched output is a simple on / off switch with a corresponding LED indicator lamp. The switch is in an open condition when the sensor to target distance is below the set point. The switch can be adjusted to trip anywhere along the sensor range using the "Switch Adj" potentiometer on the front panel. The front panel LED illuminates to indicate a closed switch position. Typical Switching speed is as follows: Turn on – 0.25mS, Turn off – 0.05mS.

