SENSOR DATA SHEET

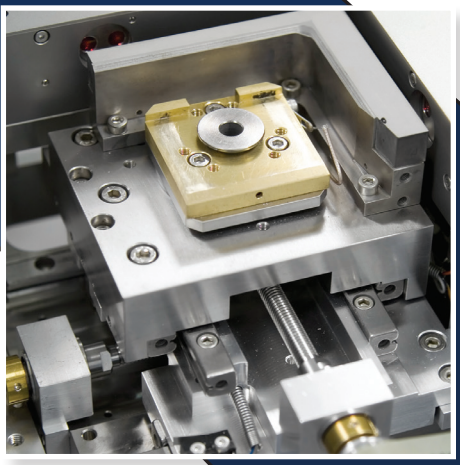


SMT-9700

Flexible, high resolution position/displacement systems for analytical and OEM applications









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KMM PRECISION MEASURING

SMT-9700

KMM
PRECISION MEASURING

Features

- 1, 2 and 3 channel configurations
- Nanometer to sub-nanometer resolution
- Easy, cost effective performance customization
- CE and RoHS compliant
- Small package size
- Thirteen standard sensor options



Overview

KMM's SMT-9700 system uses proven inductive (eddy current) technology to provide extremely high-resolution noncontact position/displacement feedback of virtually any electrically conductive target. It is ideal for applications requiring high-resolution position feedback for control and has been proven in applications including optics positioning in photolithography equipment, XYZ stage positioning in atomic force microscopy, and spindle position in precision grinding of bearing races.

When Resolution Matters

There are many aspects to performance. For some applications, resolution is paramount. For others it may be the thermal stability of the output. Or it could be linearity, frequency response, or a combination of these performance parameters.

Performance flexibility makes the SMT-9700 ideal for the OEM. The two parameters that provide the most flexibility are linearity and thermal stability. For instance, a semiconductor clean room presents a very stable thermal environment, so trading thermal stability for improved linearity makes sense. Conversely, if thermal stability is important, KMM can sacrifice linearity and tune the system for thermal stability. 5th order polynomial values can be applied to the output to correct for increased nonlinearity.

We can and often do provide output filtering to either improve resolution, or increase bandwidth. It all depends on what is important to your particular application.

In many applications the actual motion to be monitored can be very small. A full scale calibration of 100 microns is not unusual, and with a full scale output of 10VDC, sensitivity is high, in this case 100mV/micron.

When considered early in the design cycle, these trade-offs are easily managed through the proper choice of calibrated range, sensor size, and target material. With our computer modeling capabilities, we can provide you with expected performance specifications before you commit to a purchase of hardware.

To completely meet OEM requirements, we can and often do customize both the electronics packaging and sensor design. This can range from a completely custom electronics enclosure to board-level-only electronics. Sensor size, shape, mounting design, and cabling are all features that KMM can customized to fit the application.

Once hardware and performance specifications are defined, at the time of purchase, the hardware and calibration specifications are documented, and a unique KMM part number is assigned to ensure every subsequent order placed is filled with exactly the same system.

While the SMT-9700 was designed to be customized, KMM does offer standard sensors and packaging. Many applications do not require customizing, while others benefit from a proof of concept measurement study. In either case, an off-the-shelf part will help to speed delivery time. Standard sensors and specifications are shown on page 3.

SMT-9700

KMM PRECISION MEASURING

Flexible and High-Resolution

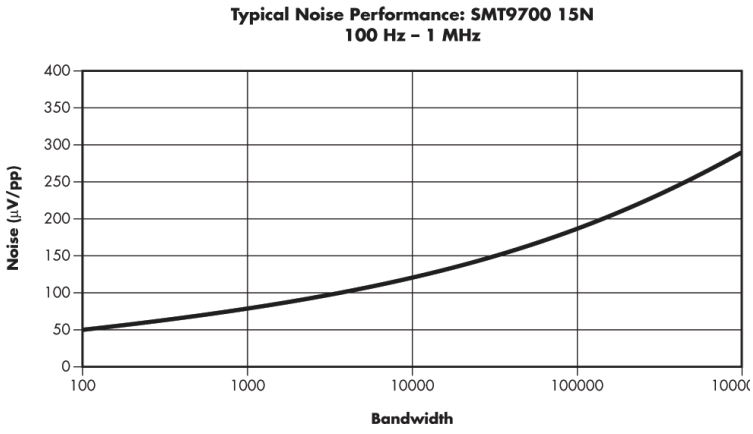
The SMT-9700 meets and exceeds the requirements of today's high precision positioning and displacement sensing applications. The system is ideally suited for applications ranging from photolithography stage positioning in semiconductor capital equipment, to position feedback in precision grinding of bearing races.

Based on proprietary architecture, the configured SMT-9700 is very cost effective, even in low-volume OEM applications. And when the volume is one, it provides superior performance for half the price of competitive technologies in lab and analytical applications.

Customize for Your Needs

KMM offers 13 popular sensors that will suit most app- lications. The SMT-9700 can be configured to work with nearly all of KMM's sensors. Inaddition,the sensors themselves can be customized to meet the particular physical and environmental constraints of the application. KMM can calibrate the sensors to a specific target material, size, and shape to complete the tailored solution.

NOISE FLOOR CHART



How to Get Started

With the performance and flexibility built into the SMT-9700, KMM needs to know your application requirements to recommend the appropriate system. To begin the process, please be prepared to discuss your needs. Typical information you will be asked by our applications engineers includes:

- Target material, size and shape
- Calibrated range
- Linearity
- Thermal sensitivity
- Resolution
- Repeatability
- Sensor cable length

SMT-9700 SENSORS

SENSOR	STANDARD MEASURING RANGE		TARGET MATERIAL	
	inch	mm	non-fer†	ferrous
2U**	0.020	0.5	■	
15N**	0.035	0.9	■	
1U1**	0.040	1.0	■	
5U**	0.050	1.3	■	
20N**	0.075	1.9	■	
9U*	0.100	2.5	■	
3U1**	0.120	3.0	■	
12U*	0.160	4.0	■	■
16U*	0.200	5.0	■	■
6U1**	0.240	6.0	■	■
26U*	0.320	8.1	■	■
38U*	0.500	12.7	■	■
51U*	0.600	15.0	■	■

Reference Sensors Data Sheet for dimensional information.

* *Operating temperature cryogenic to +400°F (+200°C), sensor dependent*

** *Operating temperature -67° to +220°F (-55° to +105°C)*

† *Non-ferrous target material is recommended for best performance. Ferrous targets are not recommended for*

SMT-9700

General Specifications

Electronics Temperature

Operating range	0° to +70°C (+32° to +158°F)
Storage range	-40° to +85°C (-40° to +185°F)
Compensation range	+15° to +55°C (+59° to +131°F)

Analog Output

Continuous load current	<20 mA
Short circuit and overload protection	Yes

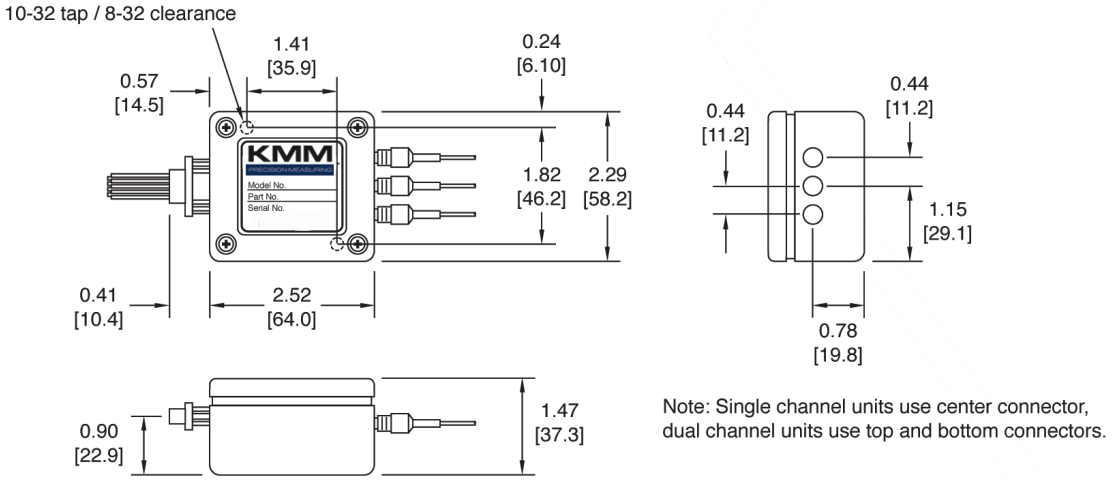
Input

Supply voltage required	15 to 30 Vdc
Current limit (no load current input)	<50 mA
Reverse polarity protection	Yes
Short circuit protection	Yes

Applications

- XYZ stage position feedback in atomic force microscopy
- Z axis feedback in semiconductor photolithography equipment
- Z axis feedback in precision grinding of bearing races
- Optics positioning
- Engrave head position feedback

OUTLINE DRAWING OF ELECTRONICS



Note: Single channel units use center connector, dual channel units use top and bottom connectors.