

Lubnotes:

Design Engineer's Guide to Selecting a Lubricant

Lubricants for Potentiometers and Sliding Position Sensors



Potentiometers and other sliding position sensors are electromechanical devices whose performance and operating life can be dramatically improved through lubrication. Each of these devices has a metal wiper that moves along a resistive element, to regulate current flow to a device or to indicate when precalibrated positions are reached. The tracks may be any of a variety of conductive materials: wound metal wire, conductive plastic or ceramic compositions. Lubricating these tracks helps prevent wear, attenuate electrical noise and extend operating life.

Selecting lubricants for potentiometers and other electromechanical sensors oil or grease. Wear prevention is the primary reason for potentiometer track lubrication. Most importantly, the lubricant film must be strong enough to prevent wear but thin enough throughout the operating range to prevent contact hydroplaning and resulting intermittencies. When working with small, delicate mechanisms with extremely low starting torque, oils may be required. However, greases, with their important stay-in-place advantage, have been the most successful potentiometer lubricants. Light, low shear greases, some approaching a semi-fluid state, can often be designed for even very low power applications.

Broad temperature film strength. Since it is the film of lubricant that prevents wear, good film strength is essential. While arcing is not usually a problem, high heat generated by resistance — the temperature can reach 225°C in automotive dimmer switches, for example — requires a lubricant to retain film strength over a broad temperature range.

Ambient conditions also affect lubricant selection. Very low temperatures cause some lubricants to become so viscous that they prevent motion. On the other hand, in underhood applications where performance-related devices are multiplying, extreme wide temperature and fuel-resistant lubricants have become a necessity.

A note about damping greases. Although not intended as track lubricants, Nye's damping greases are widely used on potentiometers and other rotary devices where shaft/bearing lubrication is needed to damp free motion and produce a "velvet feel." See our application summary on Damping Greases for details.

Selecting the right lubricant for your application. Following is a partial list of popular Nye lubricants for potentiometers and sliding position sensors. Additional oils and greases are available to meet a wide range of application requirements. For technical specifications, evaluation samples, questions about any Nye products, or to discuss a lubricant custom-designed for your application — call us at +1.508.996.6721 or visit our website at www.nyelubricants.com.

On the back of this page is a partial list of the most commonly used Nye synthetic lubricants for potentiometers and sliding position sensors.

Contact Nye at +1.508.996.6721
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Lubricants for Potentiometers and Sliding Position Sensors	Temp Range (°C)	Base Oil Viscosity at 40 °C	Applications
<u>Rheolube™ 716A</u>	-54 to 175	18.5 cSt	Ester-based grease fortified with special additives to reduce electrical noise & wear in electrical contact applications. Good wide-temp serviceability. Base fluid has excellent film strength for very high-load applications. Use with caution around ester-vulnerable plastics.
<u>NyoSil™ M25</u>	-70 to 200	60 cSt	Complex silicone oil for long term wear protection, & excellent wide-temperature performance.
<u>Fluorocarbon Gel 813-1</u>	-70 to 200	60 cSt	Wide temperature complex silicone oil in chemically inert thickener. Excellent low-temp starting torque & noise reduction properties. Ideal choice for conductive plastic potentiometers.
<u>NyoGel® 781A</u>	-70 to 200	60 cSt	Very soft, complex silicone soap-gelled grease often used as an alternative to the fluorocarbon-gelled 813 series. Recommended where electrical noise reduction is a special concern.
<u>UniFlor™ 8951</u>	-90 to 200	18 cSt	Chemically resistant fluorinated grease with exceptional low temperature capability & low-volatility. Useful where contact force is <50g. Helps prevent hydroplaning, especially where there is high-speed linear motion.
<u>UniFlor™ 8511</u>	-50 to 225	65 cSt	Chemically resistant fluorinated grease with excellent thermo-oxidative stability & low-vapor characteristics.
<u>UniFlor™ 8981</u>	-65 to 250	140 cSt	Chemically resistant fluorinated grease with wide-temp fluidity, very low volatility, & exceptional high-temp stability. Lowest shear resistance for delicate low-temp applications.