



1-TURN CONTACTLESS POTENTIOMETER

(Inductance Type)

This is a 1-turn Contactless Potentiometer using inductance coil technology, which has been developed based on our own technical know how (Japan pat.No.3009764). This Contactless Potentiometer has various excellent features such as semipermanent life expectancy, being completely free from sliding noise, high speed tracking

ability, essentially infinite resolution, etc. and can be used as an angle detecting sensor or mechanical linear displacement sensor for various kinds of mechanical and electrical devices as well as robot devices, medical equipments, measure control instruments, etc.

THE NOMENCLATURE OF SAKAE 1-TURN CONTACTLESS POT. SERIES

S KSM 22 F S - 5 G - 0000

● **Special Specifications**

S means the potentiometer with special mechanical specifications not applicable to our standards.

● **Kind**

KSM means inductance type of 1-turn contactless potentiometer.

● **Diameter**

22 means approximate outer diameter of 22mm of the potentiometer in metric system.

● **Type**

F...Popular version with metal housing and oilless bearings.
E...Low-cost version with plastic housing and oilless bearings.

● **4 digits branch number**
 to be used for specific requirements.

● **Number of gangs**

G means 2 ganged potentiometer on the same axle.
 No letter means single section only and **G3** means 3 ganged potentiometer. (This article is only applicable on F type.)

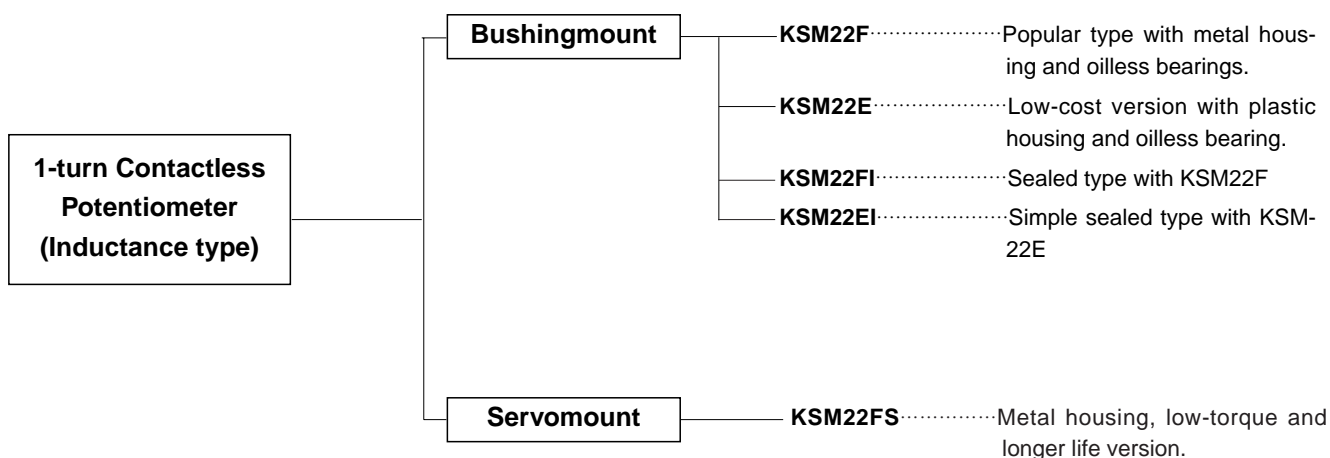
● **Applied Voltage**

5 means applied voltage of 5V.D.C. (Available 3 to 10V.D.C. on F type to your special request.)

● **Mounting Method**

S: Servomount with ball bearings
-: Bushingmount
I: Sealed and Bushingmount

SELECTION GUIDE



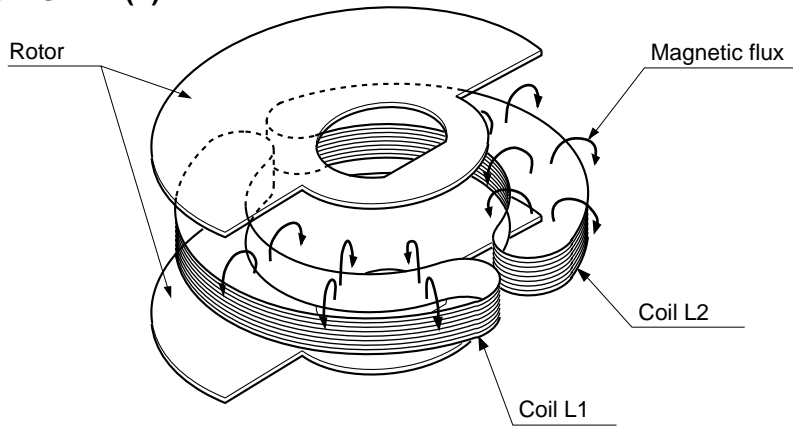
Technical Explanation on Inductance Type Contactless Potentiometer

● Principle • Construction • Function

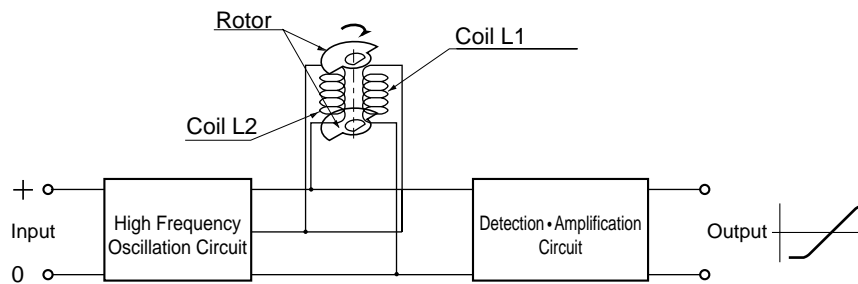
This contactless potentiometer has a pair of semicircle rotor connected to the operating shaft, a pair of detective coil putted between the semicircle rotor, high frequency oscillator to apply the coil, and a detection circuit which takes an inductance change of the coil from an eddy current on the semicircle rotor caused by high frequency oscillator, in the housing case. When rotating the shaft, the area volume opposed between the semicircle rotor and the coil varies, which brings on output change in response to the rating angle.

● Relationship between the semicircle rotor and the detection coil

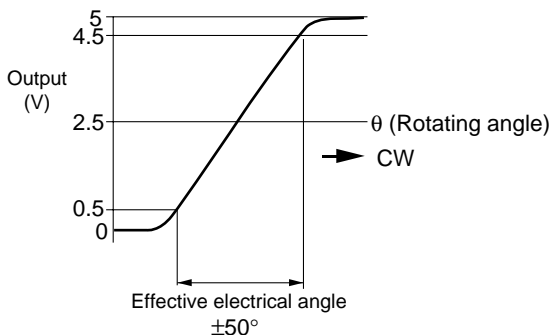
Construction of model KSM22F(E)



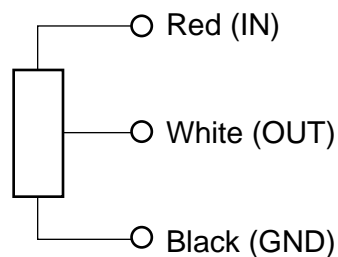
● Oscillator and Detection Circuit



● Output Claracteristic



● Leadwire (Terminal) Connection Diagram



● Standard Dimensions



● Standard Model Nos.

- KSM22F-5 (Bushingmount)
- KSM22FI-5 (Bushingmount)
- KSM22FS-5(Servomount)

● General Specifications

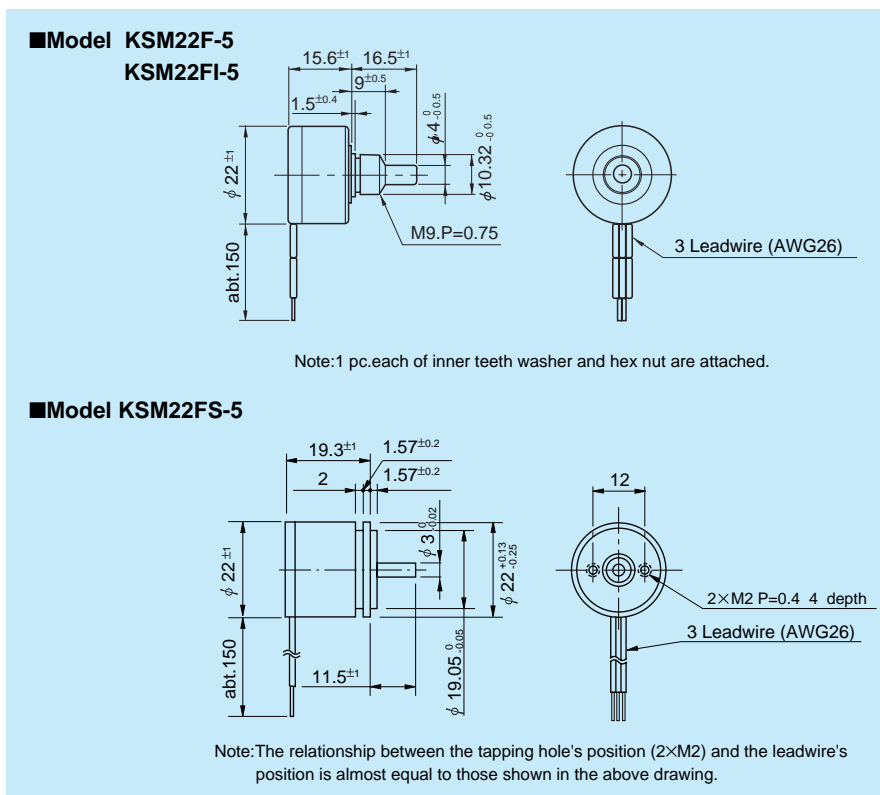
Model No.	KSM22F	KSM22FI	KSM22FS
Current Consumption	Approx. 3.5mA		
Independent Linearity Tolerance	$\pm 0.5\% \cdot FS$ (FS=100°)		
Mechanical Rotating Angle	360°(Endless)		
Effective Electrical Angle	$\pm 50^\circ$ (100°)		
Applied Voltage	5V.D.C.		
Load Resistance	10k Ω min.		
Output Sensibility	Approx. 10% ~ 90% $V_{in} \cdot FS$ (FS=100°)		
Output Temperature Characteristic	Below $\pm 2.5\% V_{out} \cdot FS$		
Drift at Center Position	Below $\pm 0.5\% V_{out} \cdot FS$		
Operating Temperature Range	-40°C ~ +105°C		
Storage Temperature Range	-40°C ~ +105°C		
Mass	Approx. 15g		
Starting Torque mN·m(gf·cm)	Below 1(10)	Below 3(30)	Below 0.2(2)

● Environmental Specifications

Model No.	KSM22F	KSM22FI	KSM22FS
Thermal Shock	5 cycles -50°C ~ +105°C		
Exposure at Low Temperature	24 hours at 50°C		
Exposure at High Temperature	1,000 hours at +105°C		
Moisture Resistance	40°C 95% RH 120 hours		
Vibration	10°C 2,000Hz 196m/s ²		
Shock	980m/s ² (18 times) 12 hours		
Life Expectancy (shaft revolutions)	Approx. 100,000,000		
Protection Grade	IP40	IP65	IP40

● Special Specifications Available

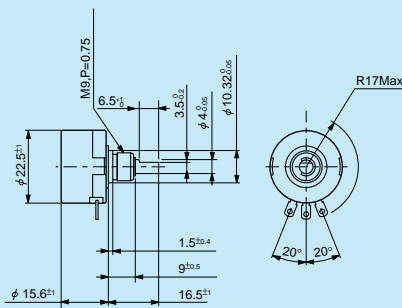
Special applied voltage (Possible to meet with from 3V.D.C. to 10V.D.C.), Special effective electrical rotating angle (Possible to meet with from $\pm 25^\circ$ to $\pm 80^\circ$), 2 or 3 ganged (Total length of housing case extends by approx. 16 mm per gang.), Special machining on the shaft.





● Standard Dimensions

■ Model KSM22E-5
Model KSM22EI-5



- Note:1) The above drawing shows the position of shaft flattened at the ratio value of 50%.
 2) 1 pc. each of inner teeth washer and hex nut are attached.
 3) Please duly note that inner construction may burn out when applying the voltage to the wrong terminals except input terminal.

● Standard Model Nos.

KSM22E-5 (Bushingmount)

KSM22EI-5 (Bushingmount)

● General Specifications

Model NO.	KSM22E	KSM22EI
Current Consumption	Approx. 3.5mA	
Independent Linearity Tolerance	$\pm 0.5\% \cdot FS$ (FS=100°)	
Mechanical Rotating Angle	360°(Endless)	
Effective Electrical Angle	$\pm 50^\circ$ (100°)	
Applied Voltage	5V.D.C.	
Load Resistance	10k Ω min.	
Output Sensibility	Approx. 10% ~ 90% $V_i \cdot FS$ (FS=100°)	
Output Temperature Characteristic	Below $\pm 2.5\% V_{out} \cdot FS$	
Drift at Center Position	Below $\pm 0.5\% V_{out} \cdot FS$	
Operating Temperature Range	-40 °C ~ +105 °C	
Storage Temperature Range	-40 °C ~ +105 °C	
Mass	Approx. 15g	
Starting Torque mN·m(gf·cm)	Below 1(10)	Below 3(30)

● Environmental Specifications

Model No.	KSM22E	KSM22EI
Thermal Shock	5 cycles -50 °C ~ +105 °C	
Exposure at Low Temperature	24 hours at -50 °C	
Exposure at High Temperature	1,000 hours at +105 °C	
Moisture Resistance	40 °C 95%RH 120 hours	
Vibration	10 ~ 2,000Hz 196m/s ²	
Shock	980m/s ² (18 times) 12 hours	
Life Expectancy (shaft revolutions)	Approx. 100,000,000	
Protection Grade	IP40	IP54