

SPECIFICATIONS

APPLICATIONS

These hallpot® potentiometers are built-to-be-used where excellent reliability and long life are required. They will operate indefinitely without fail provided that they are not abused. Available are several "standardized" versions plus a wide selection of devices made to user specifications.

The "standardized" versions conform to the geometry and dimensions of resistive potentiometers that have been used for many years. They are made to physically replace these devices; therefore, the geometry is designed so that they will fit exactly. This allows the retrofitting of existing equipment plus the design of new systems using readily available mating hardware without needing to make special adapters.

Normally we refer to a device using a journal bearing with the more-or-less basic geometry of a resistive potentiometer as a "hallpot® potentiometer". It is a precision angle-measuring sensor so, sometimes we call it a hallpot® angle sensor. Hallpot® angle sensors with internal ball bearings usually have the geometry of familiar servo mount devices so that servo-mount hardware may be used with them.

Some users have particular requirements wherein special variations are needed. Typically these include different shaft diameters or length. They may require bearings with extremely low torque or have "O-ring" seals on the shaft. They may need to be pressurized with silicone oil and be operated in the ocean at great depths. We build hallpot® devices to fill all of these requirements.

SOME TYPICAL APPLICATIONS ARE:

- ◆ DANCER-ARM POSITION CONTROL
- ◆ ROBOTIC JOINT POSITION CONTROL
- ◆ VALVE POSITION SENSORS
- ◆ CAMERA POSITION SENSORS
- ◆ ANGLE POSITION SENSING ON DEEP SEA MECHANISMS, SUCH AS CAMERAS MANIPULATOR ARMS, AND HYDROFOILS.
- ◆ MEASURING FLOW DIRECTION OF WIND, WATER OR OTHER FLUIDS IN INSTRUMENTS.
- ◆ MEASURING RPM. HALLPOT® ANGLE SENSORS MAY BE ROTATED CONTINUOUSLY FROM ZERO TO SEVERAL THOUSAND RPM.
- ◆ These are typical applications. Your application may be different.

HALLPOT® POTENTIOMETER, HALLPOT® ANGLE SENSOR, SIN-COS HALLPOT® RESOLVER, are the registered trademarks of **ELWECO, INC,**

Elweco, Inc IS THE SOURCE FOR ALL

HALLPOT® NON-CONTACTING POTENTIOMETERS ANGLE SENSORS



FEATURES

- ◆ OUTPUT SIGNAL IS GENERATED BY CONTROLLING THE POSITION OF A MAGNET NEAR A HALL EFFECT SENSOR. THERE IS NO PHYSICAL CONTACT.
- ◆ VERY LONG LIFE AND EXCELLENT RELIABILITY ARE OBTAINED BECAUSE THERE IS NO WIPER TO WEAR.
- ◆ THERE IS NO STICKION, NO BACKLASH, NO HYSTERESIS, AND NO LOSS OF SIGNAL DURING SHOCK OR VIBRATION.
- ◆ SIGNAL IS CONTINUOUS OVER 360 DEGREES.
- ◆ TORQUE IS VERY LOW AND IS LIMITED ONLY BY THE BEARINGS USED.
- ◆ SIGNAL RESPONSE IS IN THE ORDER OF THIRTY KILOHERTZ TO PERMIT HIGH SPEED TRACKING OF POSITION.
- ◆ VERSIONS ARE AVAILABLE TO ENABLE OPERATION FROM THE COMMON BATTERY OR POWER SUPPLY VOLTAGES USED IN MOST SYSTEMS. BASIC VERSIONS REQUIRE A REGULATED VOLTAGE AT OR NEAR +5.00 Vdc. THESE BASIC VERSIONS "TRACK" THE POWER SUPPLY
- ◆ VERSIONS WITH INTERNAL AMPLIFIERS CAN OPERATE FROM UNREGULATED POWER SUPPLIES. THESE NORMALLY INCLUDE OPERATION FROM THE +12, +18, +24, +28, +32 OR OTHER VOLTAGES UP TO +36 Vdc BATTERIES IN LAND VEHICLES, SHIPS, AND AIRCRAFT.

VERSIONS AVAILABLE

Three types of output signals are available depending on the model chosen. Parameters are presented in the defining equation as:

$$E_o = E_b + V_p \sin \theta$$

SPECIFICATIONS

1) --- **BASIC OUTPUT** models with no amplifiers. The parameters are stable but vary among units. An equation with typical values is:

$$E_o = 2.5 + 1.6 \sin \theta$$

Normally these versions require individual calibration by the user, using either software or calibration amplifiers.

INPUT VOLTAGE RANGE ----- + 4.5 to + 6.0 Vdc
Rated voltage for data specifications --- + 5.000 +/- 0.025

INPUT CURRENT ----- 9.0 ma

These **Basic Output Types** may be operated in a special low current mode to reduce power supply current to be as low as 20 microamperes. Consult Elweco, Inc for assistance.

OUTPUT SIGNAL --- One complete sine wave per revolution

2) --- **CONTROLLED PARAMETER** models use internal amplifiers to keep the parameters within specified values chosen by the user. The customer selects the input power range, angular operating range and output signal range. Elweco builds devices to conform such that:

$$E_o = E_b + E_p \sin \theta$$

E_b is normally 2500 millivolts but may be another value to meet user needs.

E_p is usually chosen to produce some output voltage range over a specified angle.

INPUT VOLTAGE RANGE
Tracking models -----+4.5 to + 6.0 Vdc
(Signal and E_b track the Input Voltage)

Low range models -----+7.0 to + 16.0 Vdc
--- or --- High range models -----+ 12.0 to +36.0 Vdc

INPUT CURRENT ----- 10 ma

The 7.0 to 16.0 Volt range is for operation in systems which use 12 Volt batteries or internal power supplies. The 12.0 to 36 Volt range is for any other power source of 12 volts or more. The power sources may be either regulated or unregulated.

OUTPUT SIGNAL --- One complete sine wave per revolution.

3) ---**SIN-COS HALLPOT® RESOLVERS** enable measurements over a full 360 degrees. This version is referred to as the **sin-cos hallpot® resolver**. It contains internal amplifiers which standardize both a sine output and a cosine output. The quiescent voltage, peak voltage, and phase shift are corrected to nominal values.

For the sine output the response is:

$E_{os} = E_b + E_p \sin \theta$ as the defining response with

$E_{os} = 2500 + 2400 \sin \theta$ as the standardized response

and for the cosine output it is:

$E_{oc} = E_b + E_p \cos \theta$ as the defining response with

$E_{oc} = 2500 + 2400 \cos \theta$ as the standardized response.

The sine and cosine responses are identical but are 90 degrees out of phase. The phase shift is controlled electronically to keep it close to 90 degrees.

INPUT VOLTAGE RANGE -----+5 to + 6.0 Vdc
Rated voltage for data specifications --- + 5.000 +/- 0.015 Vdc

INPUT CURRENT ----- 18 ma

OUTPUT SIGNAL ---

--- One complete sine wave per revolution --- plus---
--- One complete cosine wave per revolution.

COMMON SPECIFICATIONS

Frequency Response (-3db) ----- 30 KiloHertz

Temperature Range -----Operating ----- -40 to +125 degrees C
----- Storage----- -40 to + 125 degrees C

Reduced temperature ranges are available for industrial or commercial applications

Materials ---Case and shaft --- Anodized aluminum
--- (special versions to customer requirements may not be anodized)

MODIFICATIONS TO SPECIFICATIONS

Signal response is made according to customer requests. Additionally the geometry, dimensions, or environmental conditions may be specified by the customer. Modifications to meet Environmental conditions may require ----

1 --- Direct immersion in pressurized fluids such as crude-oil, saltwater and, mixtures of these.

2 --- Direct immersion into seawater or freshwater.

3 --- Direct immersion into pressurized natural gas pipelines.

4 --- Direct immersion into oil-filled gearboxes, pressurized or non-pressurized.

ELWECO, INC
PO BOX 909
PAINESVILLE OH 44077

Ph / Fx 440-254-1716
sales@elweco.com
www.elweco.com