C & A TRANSDUCERS INC.

Magnetic Pickups

Typical C & A Magnetic Pickups

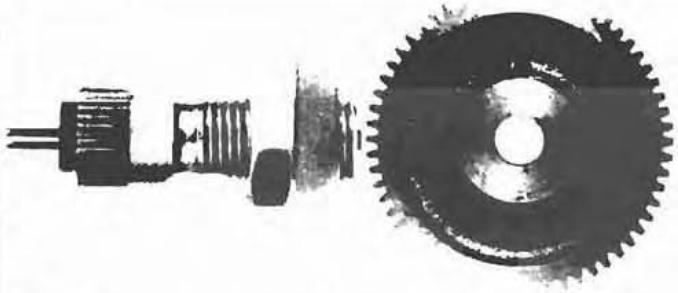
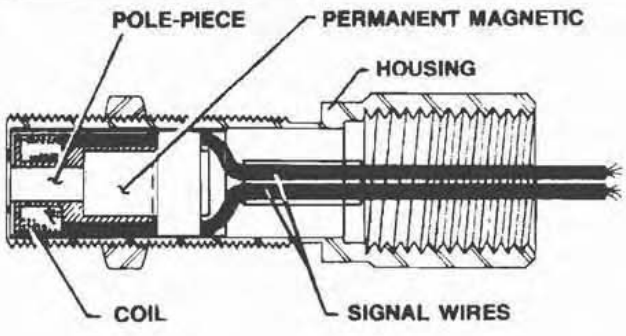


Fig. 1 -
Magnetic pickup mounted in bracket in proximity to gear.



Internal configuration fo typical pickup.

The engineering staff of C & A can design and build magnetic pickups to your specific needs. Call your local representative at: 714-554-9188.

Adrian Van De Ree
Dan Toledo

THEORY OF OPERATION

C & A magnetic pickups convert mechanical motion to an ac voltage without mechanical linkage. These permanent magnet transducers have an external magnetic field which when altered by a moving ferrous object, generates an ac voltage in a coil wound over the magnet. This ac voltage has a frequency directly proportional to RPM when the pickup is mounted in proximity to the teeth of a rotating gear. The magnitude of the voltage is proportional to the rate of change of magnetic flux, therefore the voltage is proportional to speed.

The pickup output voltage level depends on the following variables.

a. Surface speed of the gear passing by the pole-piece
b. Gap between pole-piece and gear teeth
c. Gear Pitch or gear tooth size
d. Load impedance connected to the pickup

The surface speed of a gear depends upon its diameter and RPM. All other variables remaining constant, it can be said that:

a. The pickup output voltage increases as the gear RPM increases (and)
b. The pickup output voltage increases as the gear diameter increases, (therefore)
c. The pickup output voltage increases as the gear surface speed increases since:

$$\text{Surface Speed (IPS)} = \frac{\text{RPM} \times \text{DIA} \times \pi}{60}$$

Shown in Figure 2 are the three basic types of pole piece configurations. Each offers distinct advantages over the others depending upon the application. The standard pole piece profile is cylindrical and designed for use with relatively coarse tooth gears. In numerous applications, however, the use of this type gear is not feasible, necessitating the use of a modified pole piece configuration to achieve effective performance. Conical and chisel tip pole pieces are used when a gear has a very fine pitch, or the actuating mass is very small. This allows for sharper output pulses and finer resolutions. Larger pole pieces in similar applications may not provide a sufficient output voltage since a shunting effect of the magnetic field may result when the pole piece covers more than one tooth at a time. In essence, the sensor cannot distinguish one tooth from the next.

Fig. 2 - View of regular, blind and chisel ends of magnetic pickups.

C & A TRANSDUCERS INC.

Standard Magnetic Speed Sensors

GENERAL PURPOSE

5/8"-18 Thread

SPECIFICATIONS – (625000 SERIES)

Output Voltage: 40 (P-P MIN.)
Resistance: 85 ohms (MAX.)
Inductance: 25 mh (MAX.)
Temperature Range: – 100°F to + 225°F
Pole Piece Dia. (in.): .106
Shell: Stainless Steel

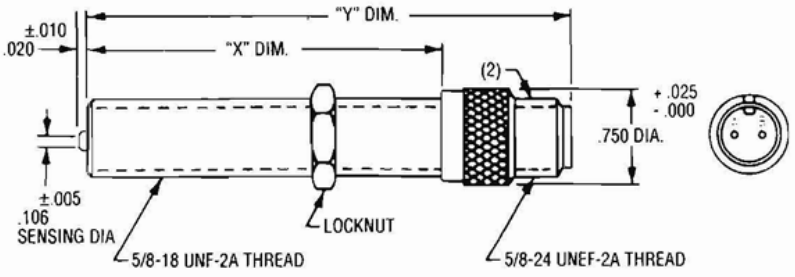
HIGH SENSITIVITY

5/8"-18 Thread

SPECIFICATIONS – (625000-1 SERIES)

Output Voltage: 190 (P-P MIN.)
Resistance: 1200 ohms (MAX.)
Inductance: 450 mh (MAX.)
Temperature Range: – 100°F to + 225°F
Pole Piece Dia. (in.): .106
Shell: Stainless Steel

MODEL NO.	DIM. "X"	DIM. "Y"
625500(-1)	5.000	6.100
625600(-1)	6.000	7.100
625300(-1)	3.000	4.100
625100(-1)	1.000	2.100
625400(-1)	4.000	5.100
625250(-1)	2.500	3.600



NOTES: (1) Tested at 1,000 inches/second with a 20 pitch, 30 tooth gear at .005" pole piece gap and 100 K onm load.
(2) Connector mates with MS-3106A-10SL-4S connector

* Also available in metric THD.M16x1.5-6g