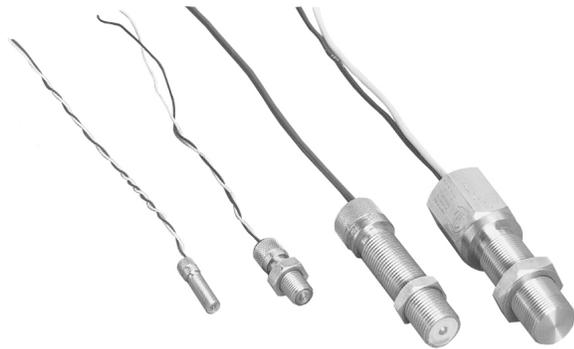


Magnetic Pickups & In-Line Pre-amplifier

Simple, Reliable & Economical Speed Sensors for:



- Speed switches
- Digital tachometers
- Frequency to DC converters

- Features include:**
- No ext. power needed
 - Wide operating temperature range
 - Epoxy encapsulated, mechanically rugged
 - Impervious to dirt, oil & water
 - No maintenance required
 - M12 connector (model specific)

DESCRIPTION OF OPERATION

A Magnetic Pickup consists of a permanent magnet, a pole-piece, and a sensing coil encapsulated in a cylindrical case. An object (*target*) of iron, steel, or other magnetic material, passing closely by the pole-piece causes distortion of the magnetic flux field, which in turn generates a signal voltage. The magnitude of the signal voltage depends on the relative size and magnetism of the target, its speed of approach, and how close it passes the pole-piece.

Magnetic Pickups are most frequently used to sense passing teeth on a gear, sprocket, or timing belt wheel. They can also be used to sense bolt-heads, key-ways, or other fast moving metallic targets. Typical targets and resulting signal wave forms are shown below in Fig. 1.

SELECTING A MAGNETIC PICKUP

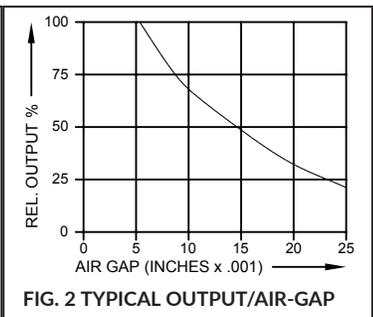
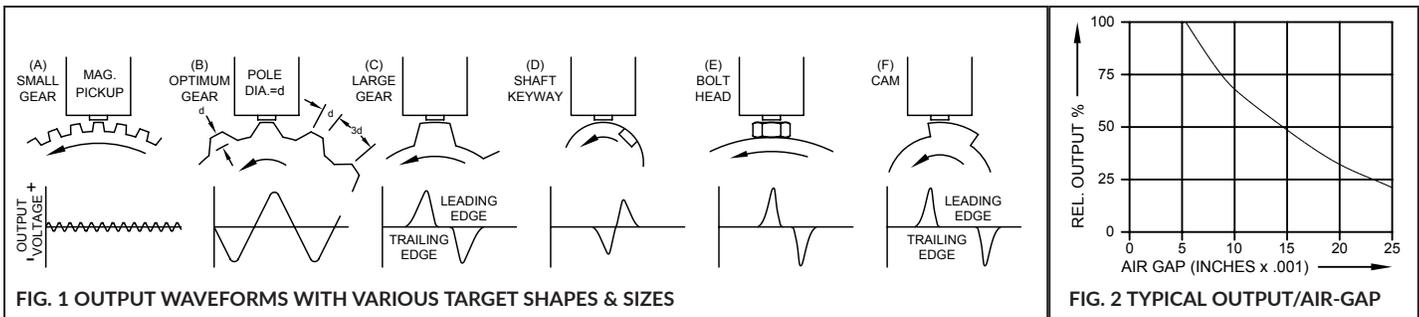
Selecting a magnetic pickup is a matter of matching a pickup to a gear (*or other target*), to provide enough input signal to a tachometer, speed-switch, or other device for operation at the required minimum speed. The open-circuit output from a magnetic pickup is directly proportional to speed, and once the minimum operating speed conditions have been met, increased signal will occur at higher speeds.

The "1-Volt Threshold Speed" column in the Application and Ordering Table (*next pg.*) provides a convenient guide for estimating minimum operating speeds. This value is the linear surface-speed of a reference gear required to generate a 1-Volt peak, open-circuit output at an air-gap of 0.005". The reference gear listed for each pickup is near the optimum size for that pickup, as defined by the criteria in Fig. 1B. The RPM listed is for

a reference gear with 60 teeth running at that surface-speed. Gears with larger teeth provide about the same or somewhat more output at the same surface-speed, while gears with smaller teeth or fewer number of teeth yield lower outputs. Figures 1C - 1F need a very high surface speed to generate a 1-Volt peak. The "Minimum Gear Size" column lists the Diametral Pitch size at which the output drops to 40-60% of the output when the reference gear is used. Gears with very small teeth in relation to the pole-piece diameter, deliver greatly reduced outputs, as shown in Fig. 1A. Threshold outputs when using targets other than gear teeth can be estimated by their relative size with respect to the reference gear teeth. For more information on gears, definitions and relationships, see the Sensing Gears Bulletin (LP0167).

The 1-Volt Threshold Speeds are based on a 0.005" air-gap. In applications where this air-gap cannot be maintained or where the air-gap can vary due to eccentricity of the sensing gear, a correction factor can be applied from the curve in Fig 2. The effect of electrical loading is usually minimal at low speeds and low output frequencies, however, output voltage drop due to loading at high frequency or with low impedance inputs can be estimated based on the Output Impedance data.

Magnetic Pickups are recommended for speed related sensing applications. They are not recommended for counting applications, since loss of counts will occur at low speeds. For devices not designed to accept a magnetic pickup input, the Red Lion Controls model ASTC can be used to convert the magnetic pickup output into an NPN open collector output. The ASTC can detect magnetic pickup outputs as low as 20 mV, which allows for operating speeds below the specified 1-Volt threshold speed.



MAGNETIC PICKUP APPLICATION & ORDERING INFORMATION

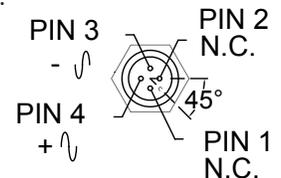
| MODEL NO. | DIMENSIONS | 1-VOLT THRESHOLD SPEED (1) | MINIMUM GEAR PITCH (2) | TEMP. RANGE °C | OUTPUT IMPEDANCE | PART NUMBER |
|-----------|------------|--|------------------------|----------------|-----------------------|-------------|
| MP-25TA | | 135 in/sec 1000 RPM 60T 24 D.P. Ref. Gear | 48 D.P. | -40 to +80 | 130 Ω ±20% 15 mH | MP25TA00 |
| MP-37TA | | 33 in/sec 200 RPM 60T 20 D.P. Ref. Gear | 32 D.P. | -40 to +80 | 340 Ω ±20% 44 mH | MP37TA00 |
| MP-37TAC1 | | 33 in/sec 200 RPM 60T 20 D.P. Ref. Gear | 32 D.P. | -40 to +80 | 340 Ω ±20% 44 mH | MP37TAC1 |
| MP-37CA | | 30 in/sec 180 RPM 60T 20 D.P. Ref. Gear | 32 D.P. | -40 to +80 | 300 Ω ±30% 65 mH | MP37CA00 |
| MP-62TA | | 10 in/sec 50 RPM 60T 16 D.P. Ref. Gear | 24 D.P. | -40 to +80 | 1200 Ω ±20% 400 mH | MP62TA00 |
| MP-62TAC1 | | 10 in/sec 50 RPM 60T 16 D.P. Ref. Gear | 24 D.P. | -40 to +80 | 1200 Ω ±20% 400 mH | MP62TAC1 |

NOTES:

1. Surface speed, of listed reference gear, is @ 0.005" air-gap.
2. Gear pitch where output will drop to 40-60% of that generated by the reference gear size, at the same surface speed.
3. Polarity, all pickups: white output lead goes positive with respect to black when target approaches pole.
4. 2-Wire shielded cable is recommended for all magnetic pickup outputs. Connect the shield to the "COMMON" or "GROUND" terminal of the instrument being used. DO NOT run Magnetic Pickup signal leads in conduit, troughs, or bundles with other power or control voltage lines.

5. Lead length of magnetic pickup should not be extended. An ASTC0000 can be used to convert the magnetic pickup signal to NPN Open Collector style output, which allows for a much greater transmission distance.
6. M12 unit color codes for CCM12S01 cable used with MP37TAC1 and MP62TAC1 is:

- PIN 3 - Blue (-)
- PIN 4 - Black (+)
- PIN 2 - NC
- PIN 1 - NC



ACCESSORIES

| MODEL NO. | DESCRIPTION | PART NUMBER |
|-----------|--|-------------|
| ASTC | In-Line Amplifier | ASTC0000 |
| CCM | Mating Cable With M12 Connector, 1 Meter In Length | CCM12S01 |



Do not dispose of unit in trash - Recycle