

## WHITE PAPER

# WP-2015: When to Choose a Magnetic Encoder Module

*When determining if something as specialized as a magnetic encoder module is the right solution, there are many points to consider when trying to determine if it is the best solution for an application.*

Many new magnetic encoder modules have come on the market in the last few years. Most of them are compact and offer some intriguing options. Magnetic encoder modules can be used in a wide range of applications, including, but certainly not limited to, the following:

- Servo/stepper motor feedback
- Mobile equipment speed and steering sensing
- Timber processing machinery
- Studio lighting and stage equipment control
- Rotary valve position monitoring and control
- Solar panel positioning
- Vending machines
- Punch presses
- Tank level monitoring
- Robotics



*Two examples of magnetic encoder modules. These compact modules are just 30 mm in diameter. The Model 30M (left) is available with 3 different connectors: 8-pin Molex, 16-pin Molex, and an M12 connector. The Model 30MT (right) is a module that includes a threaded housing and an M12 connector. The M12 connectors afford the modules an IP69K seal.*

## Application Solutions

There are several points to consider when determining the right encoder solution for an application. When considering a magnetic encoder module, there are four main points to consider.

**1. The need for an encoder with a bearingless design.** In the vast majority of applications, an encoder with bearings is the best choice because it provides an easier installation and a more stable platform for the encoder to run on. However, there are instances where a bearingless encoder is a better option:

- There are factors that are hard on bearings. Magnetic encoder modules tend to be more tolerant to shock and vibration – factors that typically shorten bearing life. If an encoder will be subjected to factors that are hard on bearing life, a magnetic encoder module offers a bearingless solution.

## WP-2015: When to Choose a Magnetic Encoder Module

- It is a high-speed application. An encoder's bearings often limit operational speed to 12,000 RPMs or less. If the application requires higher speeds, a bearingless module might be the solution.
- Cost is a major factor. Since encoder modules have no bearings and associated support parts, they often cost less and can be more economical. Encoder modules often requires more effort to install, however, and this effort may negate any up-front savings on the cost of the encoder.

**2. Space is limited.** There can be a variety of reasons why space is limited for an encoder. Occasionally, the encoder is overlooked in the design phase, and engineers suddenly find themselves with very little space for a key component in the configuration. Often the constraints of a machine's design simply won't allow more space. In any case, magnetic encoder modules tend to be compact in size, but – when designed well – will still provide accurate feedback and motion control.

**Robotics** is an excellent example of an application with limited space for a motion feedback device. Precise and exact feedback is required, but there is often not enough space for a traditional rotary encoder. That is when a space-saving encoder module can provide the necessary motion feedback without requiring adjustments to the overall size of the robot.

**3. A heavy-duty seal is required on the encoder.** Not all magnetic encoder modules offer heavy-duty sealing options. Verify the IP ratings on the seals offered on any unit under consideration. If the encoder will need protection from washdown, a sealing rating of IP50 is insufficient, and may require a sealing rating of IP69K. Conversely, if the encoder will be fairly well protected, it is not economical to pay for a higher IP-rated seal than the application requires. For more information on IP ratings and what they mean, refer to Technical Bulletin [TB-106: Sealing Options for EPC Encoders](#).

**4. Versatile mounting options are necessary.** The “magnetic” in “magnetic encoder module” provides some options that may not be available with typical encoders. Even with the tolerance for a large air gap and tolerance for misalignment, you may still have a tricky installation that requires a creative solution. Many magnetic encoder modules offer various mounting options. The examples at right and on the following page demonstrate different mounting options, including an encoder with a threaded housing.



*In this mounting option, a magnetic encoder module is coupled with a magnet holder that pushes onto the shaft.*



1. An encoder module with a threaded housing.
2. The encoder module mounted on an adaptor.
3. The encoder and adaptor mounted on a small motor.

## WP-2015: When to Choose a Magnetic Encoder Module

EPC's [Model 30M](#) and [Model 30MT](#) are compact magnetic encoder modules designed for the most extreme industrial environments. They offer:

- Sealing options up to IP69K
- Operating temperature range of -40° to 120° C
- Shock and vibration rating that conforms to Mil-STD-202G

With a large air gap and tolerance to misalignment, available resolutions of 1 to 1024 CPR (4096 PPR with Quadrature Counting), and easy alignment and installation, the Model 30M or Model 30MT are excellent solutions when you need a magnetic encoder module. Watch the videos to see how simple it is to install the [Model 30M](#) or [Model 30MT](#). Or read this [case study](#) to learn how the compact Model 30M kept a huge timber-processing machine going.

If you still have questions about how an encoder would work in your specific application, or anything else encoder-related, give us a call. When you contact EPC, you talk to real engineers and encoder experts who can answer your toughest encoder questions. [Contact EPC](#) today to get the information you need.



*This installation is using an over-the-shaft magnet holder. This magnet holder includes a set-screw, for precise placement of the magnet on the shaft.*