

# FRS

## FREE-RUN SPEED SENSOR

### FEATURES

#### KEYENCE™ DIGITAL FIBER SENSOR

- LCD digital display: for easy sensor programming and signal monitoring
- Simple, user friendly functions
- Select light-operate or dark-operate functions

#### FIBER OPTIC SENSOR CABLE

- Composed of a single sensing end that emits a sensing beam and receives reflected light
- Armored ToughFlex™ flexible stainless steel jacket protects fiber from daily wear and resists entanglement or shock
- More flexible than conventional spiral tubes with a tight bend radius of 2 mm and minimal optical attenuation

#### ARM AND BASE

- Flexible arm enables easy positioning of the sensor end to the motor shaft
- Base is supplied with 8 mm and 10 mm T-nuts for mounting to a PT Series T-slot Base Plate or TAB Series Dynamometer Table.

### DESCRIPTION

Magtrol's FRS Free-Run Speed Sensor is used for accurate measurement of the free-run speed of any motor.

The FRS Sensor is composed of 3 primary components:

- Keyence™ Digital Fiber Sensor
- Fiber Optic Sensor Cable
- Flexible Arm with Base

### APPLICATION

#### PROBLEM

When a motor is coupled to a dynamometer, or any device that has a shaft supported by ball bearings, there will be a small amount of drag load placed on the motor due to friction in the bearings. Ensuring optimal alignment of the motor and



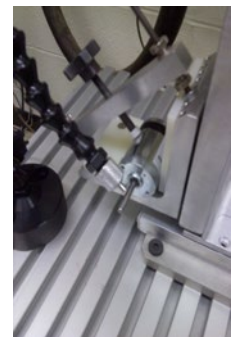
Fig. 1: FRS Free-Run Speed Sensor

dynamometer shafts, as well as using higher-quality bearings and lubricants, can reduce this drag load. However, even when employing these tactics, drag load can never be completely eliminated. All motors will show a slightly greater current draw from the residual drag load, and some motors will show a reduction in free-run speed.

#### SOLUTION

Magtrol's FRS Free-Run Speed Sensor is designed for applications where it is necessary to acquire speed readings that are unaffected by drag load. Before connecting a motor to the dynamometer, the free-run speed can be obtained from the FRS Sensor. With its reflective sensor, the FRS does not need to be attached to the motor but only placed close to the motor shaft (as shown in the photo to the right). Note: For best contrast, the shaft should be marked with reflective tape.

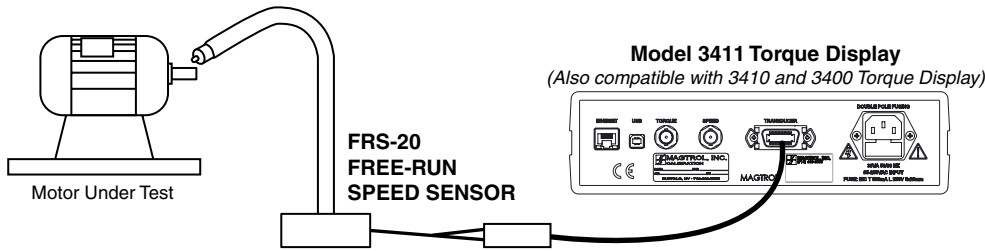
The sensing end of the fiber optic assembly emits and receives light reflected from the shaft, and sends the speed signal to the digital fiber sensor. The raw speed data is then transmitted to either a Magtrol 3411 Torque Display or DSP7000 Dynamometer Controller where it is converted and displayed in rpm.



## SPECIFICATIONS

FLEXIBLE ARM	
Construction	steel with chrome finish
Minimum Bend Radius	1.5 in / 35 mm
Arm Length	15 in / 380 mm
KEYENCE™ DIGITAL FIBER SENSOR	
See the <a href="#">Keyence™ Digital Fiber Sensor</a> Data Sheet	

## SYSTEM CONFIGURATION



NOTE: The FRS Free-Run Sensor can also be used with Magtrol's DSP7000 Dynamometer Controller. The 3411/DSP7000 also supplies power to the FRS Sensor.

## ORDERING INFORMATION

MODEL	DESCRIPTION
FRS-20	Free-Run Speed Sensor with 14-pin cable
FRS-21	Free-Run Speed Sensor with pigtail wires