

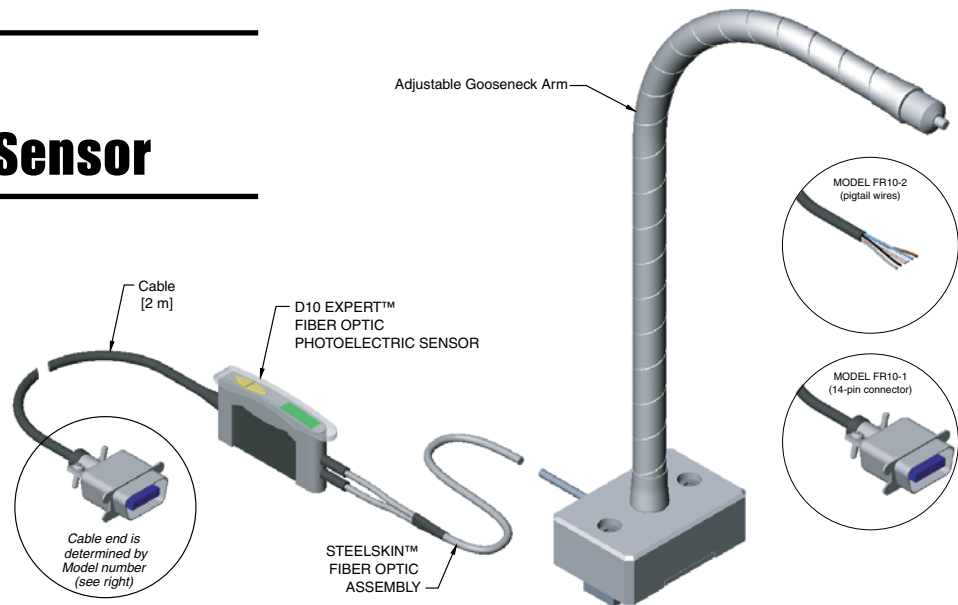
# FR10 Free-Run Speed Sensor

## DESCRIPTION

Magtrol's FR10 Free-Run Speed Sensor is used for accurate measurement of the free-run speed of any motor under test.

The FR10 Sensor is composed of 3 primary components:

1. Programmable Photoelectric Sensor with LCD Display
2. Fiber Optic Assembly
3. Flexible Gooseneck Arm with Base



## FEATURES

### D10 Expert™ Fiber Optic Sensor

- Advanced LCD digital display: for easy sensor programming and signal monitoring
- Simple one-touch operation
- Teachable microprocessor: sensor dynamically “learns” the speed of the rotating motor shaft
- Select light-operate, dark-operate, channel display, and timing functions

### STEELSKIN™ Plastic Fiber Optic Assembly

- Composed of a single sensing end, that both emits a sensing beam and receives reflected light, and bifurcated dual control (sensor) ends which attach separately to the photoelectric sensor
- Constructed with stainless steel braid over monocoil reinforcing wire
- Rugged sheathing provides superior resistance to wear, abrasion, kinking, cutting and snagging
- Lightweight with a tight bend radius

### Arm and Base

- Adjustable gooseneck arm enables easy positioning of the sensor end to the motor shaft
- Base is equipped with 25 mm T-nuts for mounting to a grooved base plate

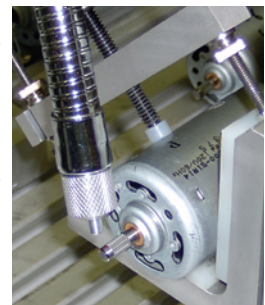
## APPLICATION

### 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 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 FR10 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 FR10 Sensor. With its photoelectric sensor, the FR10 does not need to be attached to the motor but only placed within a ¼ inch of the of 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 fiber optic sensor. The raw speed data is then transmitted to either a Magtrol 3410 Torque Display or DSP6001 Dynamometer Controller where it is converted and displayed in rpms.

D10 EXPERT™ FIBER OPTIC SENSOR	
Sensing Beam	Visible red, 680 nm
Supply Voltage and Current	12–24 VDC (10% maximum ripple) at < 65 mA exclusive of load
Supply Protection Circuitry	Protected against reverse polarity and transient voltage
Output Configuration	2 independently configurable NPN outputs
Output Rating	150 mA, maximum load OFF-state leakage current: < 10 µA at 24 VDC ON-state saturation voltage: < 1.5 VDC @ 150 mA
Output Protection Circuitry	Protected against false pulse on power-up and continuous short-circuit
Output Response Time	Programmable, 50 µs, 200 µs, 1 ms, 2.5 ms Note: < 1 second delay on power-up; outputs do not conduct during this time
Adjustments	Two push-buttons for (TEACH) switching threshold response time, OFF-delay, light/dark operate and display
Indicators	Four-digit digital display plus LED indicators for active channel, push-button lockout, OFF-delay and light/dark operate selection Two yellow LEDs serve as output indicators and active channel indicator
Construction	Black ABS/polycarbonate alloy housing, clear polycarbonate cover
Environmental Rating	NEMA 1, IEC IP50
Operating Temperature	-20 °C to +55 °C (-4 °F to +131 °F)
Maximum Relative Humidity	90% @ 50 °C (non-condensing)
Connection	PVC-jacketed 2 m (6.5') 6-wire cable Cable ends: 14-pin connector or pigtail wires, depending on model
Mounting Options	35 mm DIN rail (mounting bracket included with self-adhesive Velcro backing)

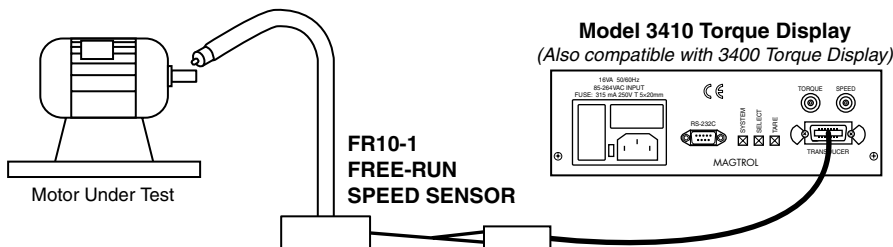
STEELSKIN™ PLASTIC FIBER OPTIC ASSEMBLY		
Type	bifurcated (2-way)	
Construction	coaxial thread, 304 stainless steel braid jacket	
Core Material	PMMA (acrylic)	
Optical Fiber Diameter:	<i>in</i>	<i>mm</i>
Monocoil	Ø 0.02	Ø 0.5
Stainless braid	9 × Ø 0.01	9 × Ø 0.25
Minimum Bend Radius	0.5 in	13 mm
Cable Length	24 in	620 mm
Operating Temperature	-30 °C to +70 °C -20 °F to +158 °F	

GOOSENECK ARM		
Construction	steel with chrome finish	
Minimum Bend Radius	4 in	100 mm
Arm Length	15 in	380 mm

## ORDERING INFORMATION

Model	Description
FR10-1	Free-Run Speed Sensor with 14-pin cable
FR10-2	Free-Run Speed Sensor with pigtail wires

## SYSTEM CONFIGURATION



*NOTE: The FR10 Free-Run Sensor can also be used with Magtrol's DSP6001 Dynamometer Controller.*

*The 3410/DSP6001 also supplies power to the FR10 Sensor.*

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