



*Instruction Manual*

**M-190W / MT-190  
Magnetic Sensors/Amplifiers**



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# SAFEGUARDS AND PRECAUTIONS



Read and follow all instructions in this manual carefully, and retain this manual for future reference.

Do not use this instrument in any manner inconsistent with these operating instructions or under any conditions that exceed the environmental specifications stated.

These instruments are not user serviceable. For technical assistance, contact the sales organization from which you purchased the product.



**In order to comply with EU Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE):** This product may contain material which could be hazardous to human health and the environment. DO NOT DISPOSE of this product as unsorted municipal waste. This product needs to be RECYCLED in accordance with local regulations; contact your local authorities for more information. This product may be returnable to your distributor for recycling; contact the distributor for details.

## Compliance

- **CE Compliant**
- Low Voltage Directive (LVD) 2014/35/EU
- Electromagnetic Compatibility Directive (EMC) 2014/30/EU
- Restriction of Hazardous Substances (RoHS 3) Directive 2015/863/EU

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Monarch Instrument's Limited Warranty applies.  
See [www.monarchinstrument.com](http://www.monarchinstrument.com) for details.

Warranty Registration and Extended Warranty Coverage information is available online at [www.monarchinstrument.com](http://www.monarchinstrument.com).

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## 1.0 DESCRIPTION

The M-190W Magnetic Sensor is a rugged, high performance self-powered magnetic pickup sensor primarily used for measuring speed using gear teeth, but bolt heads, slots or keys also work. The sensor mounts within 0.005 inches [0.127 mm] of a minimum 0.1 inch [2.5 mm] diameter ferrous target. The sensor self-generates an AC signal and requires no power from any display module. The M-190W has a 10 ft. [3 m] shielded cable terminated with tinned wires.

The MT-190 Magnetic Trigger Amplifier Module enhances the performance of the M-190W Magnetic Sensor. The amplifier extends the operating gap for the sensor to 0.25 inches [6.35 mm] from the ferrous target. The Amplifier Module has a 1.5-foot [0.46 m] cable terminated with:

Model	Cable Termination
MT-190W	Tinned wires
MT-190P	1/8 in. [3.5 mm] male stereo plug

The MT-190 provides a pulsed output signal and is TTL compatible with 5 V dc supplied.

## 2.0 COMPATIBILITY

The **M-190W** Magnetic Sensor is compatible with all Monarch ACT Series Panel Tachometers, F2A1X Frequency to Analog Converter/Tachometer, and MT-190 Magnetic Trigger Amplifier Modules.

The **MT-190W** Magnetic Sensor with Magnetic Trigger Amplifier Module with tinned wires is compatible with all Monarch ACT Series Panel Tachometers, Frequency to Analog Converter/Tachometers, DataChart™ 1250 Paperless Recorders, and DataChart™ 6000 Paperless Recorders (with the optional 24 V dc Transmitter Power Supply or External supply). The MT-190W can also be used with the illumiNova® Fixed Mount Stroboscope with an optional input cable.

The **MT-190P** Magnetic Sensor with Magnetic Trigger Amplifier Module with stereo plug is compatible with the following Monarch instruments: Pocket Laser Tachometer 200 (PLT200), SPSR Self-Powered Sensor, Nova-Pro® 300 and 500 LED Stroboscopes/Tachometers, Deluxe Nova-Strobes (dax, dbx, DBL), Phaser-Strobes (pbx, PBL), Vibration Strobe (vbx), and Pocket LED Strobe (PLS).

The MT-190W and MT-190P can also output pulses to a user's data acquisition system.

### 3.0 CONNECTION DETAIL

#### 3.1 Connection Detail for M-190W Sensor

When using the M-190W with any Monarch ACT Series Panel Tachometer or F2A1X Frequency to Analog Converter/Tachometer, refer to the instrument instruction manual for sensor connection details.

##### Connection Detail for M-190W Sensor Wires:

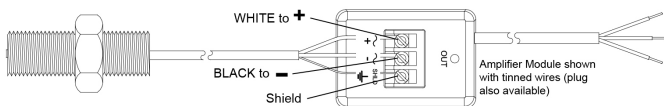
Wire Color	Function
Black	AC Signal
White	AC Signal
Shield	Housing Ground

**Note:** Cable shield is not connected to sensor shell and is intended to be connected to the instrument panel ground.

The user can increase the cable length up to a total of 500 ft. [152.4 m] in length.

#### 3.2 Magnetic Sensor to Amplifier Connection Detail

When ordered as MT-190W or MT-190P, the M-190W Magnetic Sensor must first be connected to the Magnetic Trigger Amplifier Module. Refer to Figure 1.



**Figure 1 Magnetic Sensor-to-Amplifier Connection Detail**

#### 3.3 Connection Detail for MT-190W

When using the MT-190W with any Monarch instrument, refer to the instrument instruction manual for sensor connection details.

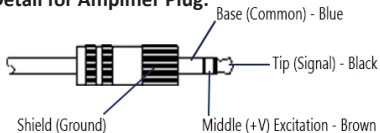
##### Connection Detail for Amplifier Tinned Wires:

Wire Color	Function	Unit
Brown	Positive Power Supply	+V
Blue	Common	Com
Black	Signal (+ V to 0 V dc pulse)	Sig
Shield	Sensor Ground	Gnd

### 3.4 Connection Detail for MT-190P

When using the MT-190P with any Monarch instrument, plug the 1/8 in. [3.5 mm] phone plug into the input jack on the respective instrument.

#### Connection Detail for Amplifier Plug:



## 4.0 OPERATION

**M-190W (sensor):** Magnetic sensors convert motion of a ferrous target into an AC voltage output proportional to speed. The target must not be smaller than the magnetic poll piece (0.106 in./2.692 mm) or larger than the diameter of the sensor (0.625 in./15.875 mm). Gear teeth are preferred, but bolt heads, slots or keys also work.

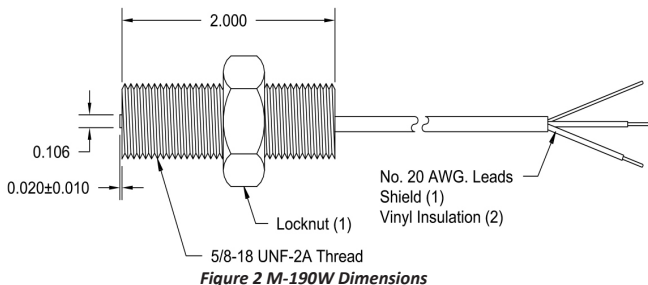
**MT-190 (sensor with amplifier):** The Amplifier Module amplifies the signal of the Magnetic Sensor and converts it to square wave pulses. The Amplifier Module extends the operating gap for the sensor to 0.25 in. [6.35 mm] from the ferrous target.

## 5.0 SPECIFICATIONS

### 5.1 M-190W Magnetic Sensor Specifications

Specifications*	M-190W Magnetic Sensor
Operating Distance	0.005" [0.127 mm] gap w/ 0.1" target [2.5 mm] min.
Speed Range	1-99,999 RPM
Operating Temp	-100 °F to 250 °F (-73 °C to 120 °C)
Power Required	None (self-generating)
Output Signal	190 V peak-to-peak
Min. Target Size	0.106 in. [2.692 mm]
Pole Type	Flush pole, $\varnothing$ .130 in. [3.3 mm]
Standard Cable	10 ft. [3 m]
Dimensions (L x dia)	2 in. x 0.625 in. [51 x 16 mm]

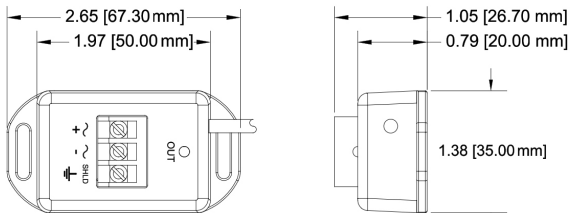
3 \*Specifications are subject to change without notice.



## 5.2 MT-190 Magnetic Sensor with Amplifier Specifications

Specifications*	MT-190 Magnetic Sensor with Amplifier
Operating Distance	0.25" [6.35 mm] gap w/ 0.1" target [2.5 mm] min.
Speed Range	1-99,999 RPM
Operating Temp	20 °F to 160 °F (-6 °C to 70 °C)
Power Required	3.3 to 24 V dc, 15 mA
Output Signal	TTL same as source
Standard Cable	Sensor: 10 ft. [3 m] Amplifier: 1.5 ft. [0.46 m]
Dimensions (L x dia)	Amplifier: 2.65 in. (L) x 1.38 in. x 1.05in. [67.3 mm x 35.0 mm x 26.7 mm]

\*Specifications are subject to change without notice.



**Figure 3 Amplifier Module Dimensions**

## The Professional's Choice

Monarch Instrument is committed to excellence and quality in manufacturing, sales, and service.



Portable  
Tachometers



Track-It™ Data Loggers



Panel Tachometers



Fixed Mounted  
Strobes



Portable Strobes



Frequency  
Converters



Speed Sensors



DataChart™ Paperless  
Recorders



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