Short S Series Slip Ring Assembly

Models Short S4/X, S8/X

- 4 and 8 circuit slip rings
- Compact design
- Sealed against dust
- Color coded terminals
- Thin section bearings
- Stainless steel & Aluminum housing
- Instrumentation quality rings and brushes

Description

Michigan Scientific's *Short S Series Slip Ring Assemblies* are utilized for a variety of applications requiring up to 8 circuit connections. They are designed to mount on the end of a rotating shaft and make electrical connection to strain gages, thermocouples, or other sensors that have been installed on rotating equipment. The slip ring brushes and rings are made of precious metals that minimize noise and enable the assemblies to be used for low level instrumentation signals. In addition, a stainless steel and Aluminum case provides protection from dust and other contaminants.

The *Short S Series* models are available in 4 and 8 circuit slip ring assemblies. Connections are made through color coded solder terminals located on the slip ring rotor and a connector on the slip ring stator. Permanently lubricated bearings eliminate the need for routine cleaning and maintenance. The lightweight and compact design of these slip ring assemblies make them ideal for use in applications where limited space is available.

Specifications

	S4/X	S8/X
Circuits	4	8
Current Capacity per Circuit	500 mA	500 mA
Temperature Range*	30°F to 280°F (-1°C to 138°C)	
RPM Rating	12,000 RPM	12,000 RPM
Maximum Peak Noise**	0.1Ω	0.1Ω
Weight	2.6 oz. (74 g)	3.1 oz. (88 g)
Length (see back)	0.872 in (22.15 mm)	1.072 in (27.23 mm)
*The SHORT-S series are primarily used on engines in vehicles where space is limited. These applications are usually hot, high speed and high vibration. The slip rings are optimized for good electrical performance in these conditions. If your environment is colder, please specify your temperature range when ordering.		
** Resistance variation across any pair of slip ring contact		

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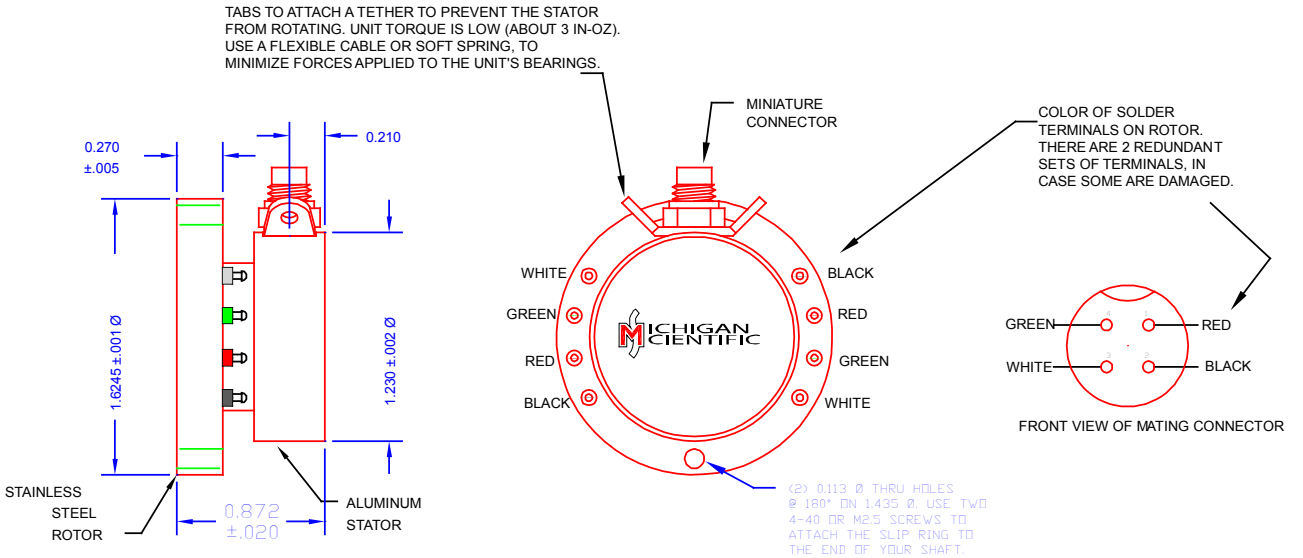
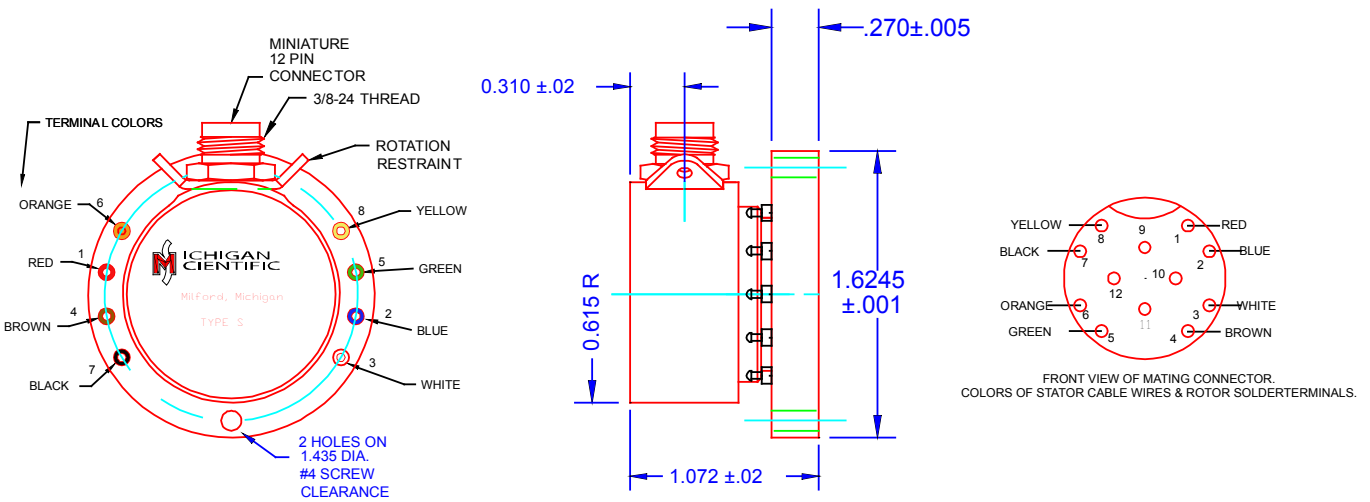
Short S Series Slip Ring Assembly

Short S4/X Configuration



Short S8/X Configuration



Mounting

These models can easily be mounted to the end of a shaft. Refer to the literature on *S Series Slip Ring Assemblies* for a detailed drawing and description of the mounting procedure.

Contact Michigan Scientific for applications in which the slip ring assemblies are subjected to extreme vibration.

Ordering Options

For information regarding slip ring accessories, refer to Tech Note 7 section of the catalog.

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S Series Slip Ring Assembly

Models S4, S6, S8, S10

- 4,6,8 and 10 circuit slip rings
- Sealed against dust
- Color coded terminals
- Lightweight and compact
- Permanently lubricated bearings
- Rugged stainless steel construction
- Instrumentation quality rings and brushes

Description

Michigan Scientific's *S Series Slip Ring Assemblies* are utilized for a variety of applications requiring up to 10 circuit connections. They are designed to mount on the end of a rotating shaft and make electrical connection to strain gages, thermocouples, or other sensors that have been installed on rotating equipment. The slip ring brushes and rings are made of precious metals, which minimize noise and enable the assemblies to be used for low level instrumentation signals. In addition, a high grade stainless steel case provides protection from dust and other contaminants.

These *S Series* models are available in 4, 6, 8, and 10 circuit slip ring assemblies. Connections are made through color coded solder terminals located on both the slip ring rotor and slip ring stator. Permanently lubricated bearings eliminate the need for routine cleaning and maintenance. The lightweight and compact design of these slip ring assemblies make them ideal for use in applications where space is limited.

Specifications

	S4	S6	S8	S10
Circuits	4	6	8	10
Current Capacity per Circuit	500 mA	500 mA	500 mA	500 mA
Temperature Range*	-40°F to 250°F (-40°C to 121°C)	-40°F to 250°F (-40°C to 121°C)	-40°F to 250°F (-40°C to 121°C)	-40°F to 250°F (-40°C to 121°C)
RPM Rating	12,000	12,000	12,000	12,000
Maximum Peak Noise**	0.1Ω	0.1Ω	0.1Ω	0.1Ω
Weight	3.9 oz. (111 g)	4.0 oz. (113 g)	4.1 oz. (116 g)	4.2 oz. (119 g)
Length "A" (see back)	1.3 in (33 mm)	1.4 in (36 mm)	1.6 in (41 mm)	1.6 in (41 mm)
*For operation below 0°F, specify low temperature lubricant.				
** Resistance variation across slip ring contact				

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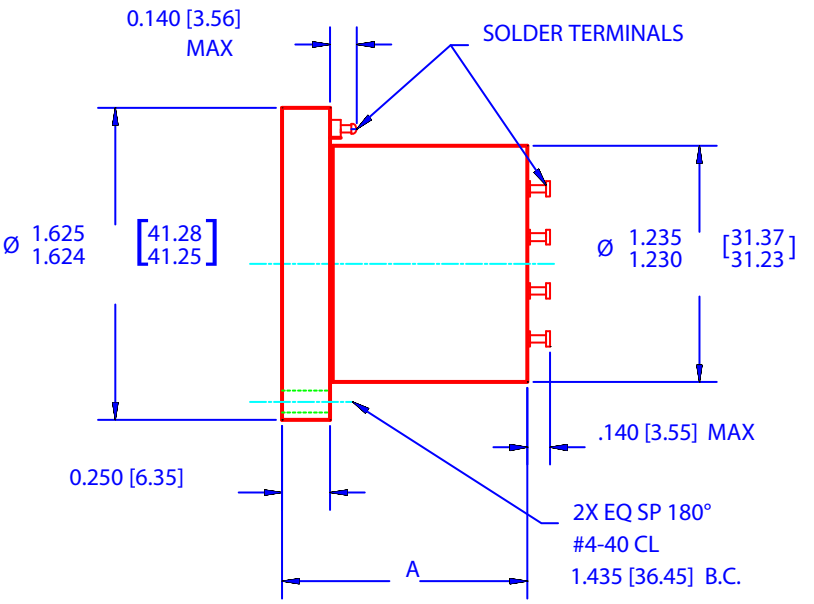
S Series Slip Ring Assembly

S-Series Configuration



DIMENSIONS ARE INCH [mm]

C566019A
S-Series
06/22/2014

MODEL	A
S4	1.2 [30]
S6	1.3 [33]
S8	1.5 [38]
S10	1.5 [38]

Mounting

The *S Series Slip Ring Assemblies* can easily be mounted to the end of a shaft. An adapter may be required for mounting the slip ring to an instrumented shaft. The slip ring rotor is configured with two #4-40 clearance holes, 180° apart, used for mounting. Signal wires from the sensor can be routed along the outside diameter of the shaft or through the center of a hollow shaft. A slot must be machined in the shaft or adapter to open a pathway to the slip ring rotor terminals when signal leads are routed through the center of the shaft.

Contact Michigan Scientific for applications in which the slip ring assemblies are subjected to extreme vibration.

Ordering Options

For information regarding slip ring accessories, refer to Tech Note 7sectionof the catalog.

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SR- Series Slip Ring Assembly

Models SR10M, SR20M, SR36M

- 10, 20, and 36 circuit slip rings
- Instrumentation quality rings and brushes
- Rugged stainless steel construction
- Lightweight and compact
- Permanently lubricated bearings
- Color coded terminals
- Sealed against dust

SR10M SR20M SR36M

Description

Michigan Scientific's *SR Series Slip Ring Assemblies* are used for a variety of applications requiring 10, 20, or 36 circuit connections. They are designed to mount on the end of a rotating shaft and make electrical connections to strain gages, thermocouples, or other sensors that have been installed on rotating equipment. The slip ring brushes and rings are made of precious metals, which minimizes noise and enables the assemblies to be used for low level instrumentation signals. In addition, a high grade stainless steel case provides protection from dust and other contaminants.

The *SR10M* model is designed with a convenient, manually operated, brush lifter to extend the life of the slip ring assembly. When it is not necessary to make electrical connection through the slip ring, the brushes can be lifted off the rings, while the slip ring continues to rotate, thus reducing the amount of wear.

Connections to the slip ring assemblies are made through color coded solder terminals located on both the slip ring rotor and stator. Permanently lubricated bearings eliminate the need for routine cleaning and maintenance. The circuit options available on these slip ring models make them ideal for use in instrumentation applications where a substantial number of circuit connections are required.

Specifications

	SR10M	SR20M	SR36M
Circuits	10	20	36
Current Capacity per Circuit	500 mA	500 mA	250mA
Temperature Range*	-40°F to 250°F (-40°C to 121°C)	-40°F to 250°F (-40°C to 121°C)	-40°F to 250°F (-40°C to 121°C)
RPM Rating	12000 RPM	4000 RPM	2400 RPM
Maximum Peak Noise**	0.1Ω	0.1Ω	0.1Ω
Weight	6.5 oz. (184 g)	7.2 oz. (204 g)	9 oz. (255 g)
Length "A" (see back)	1.8 in (46 mm)	2.4 in (61 mm)	3.6 in (91 mm)
*For operation below 0°F, specify low temperature lubricant."			
** Resistance variation across slip ring contact.			

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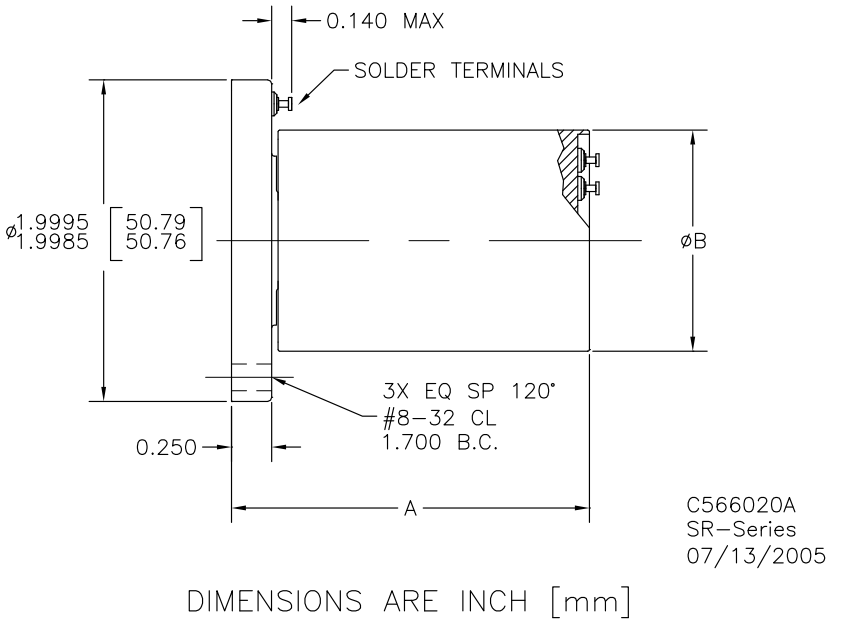
SR- Series Slip Ring Assembly

SR-Series Slip Ring Configuration



MODEL	A	B
SR10M	1.62 / 1.68*	1.375
SR20M	2.23	1.375
SR36M	3.51	1.440
**To top of brush lifter*		

Mounting

The *SR Series Slip Ring Assemblies* can easily be mounted to the end of a shaft. An adapter may be required for mounting the slip ring to an instrumented shaft. The slip ring rotor is configured with three #8-32 clearance holes, 120° apart, used for mounting. Signal wires from the sensors can be routed along the outside diameter of the shaft or through the center of a hollow shaft. A slot must be machined in the shaft or adapter to open a pathway to the slip ring rotor terminals when signal leads are routed through the center of the shaft.

Contact Michigan Scientific for applications in which the slip ring assemblies are subjected to extreme vibration.

Ordering Options

For information regarding slip ring accessories, refer to Tech Note 107 section of the catalog.

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Rev. A

Slip Ring & Encoder Assembly

Model SR10M/E60

- 10 circuit slip ring
- 60 pulse encoder
- Slip ring brush lifter
- Sealed against dust
- Color coded terminals
- Lightweight and compact
- Instrumentation quality rings and brushes
- Weatherproof units available

Description

The Michigan Scientific *SR10M/E60 Slip Ring and Encoder Assembly* is used for applications requiring both a slip ring and an encoder. It is designed to mount on the end of a rotating shaft and make electrical connection to strain gages, thermocouples, or other rotating sensors, while simultaneously providing pulses to measure rotational speed. The slip ring brushes and rings are made of precious metals which minimize noise and enable the assemblies to be used for low level instrumentation signals.

The *SR10M/E60* accepts up to 10 circuit connections and incorporates a pulse encoder that enables rotational speed to be measured. The encoder generates a 60 pulse per revolution square wave signal with a range of 0 to 6000 RPM. Since the pulses per second are equivalent to RPM, rotor speed can be recorded directly from a frequency display without scale conversion. Analog output signals for rotational speed can be obtained by using the *SR10M/E60* with Michigan Scientific's frequency to voltage encoder electronics.

This model is also designed with a convenient manually operated brush lifter to extend the life of the slip ring assembly. When it is not necessary to make electrical connection through the slip ring, the brushes can be lifted off the rings. The slip ring will continue to rotate, however, the brushes will not be in contact with the rings and wear will therefore be reduced.

Connections to the slip ring rotor are made through color coded solder terminals located on both the slip ring rotor and slip ring stator. Permanently lubricated bearings eliminate the need for routine cleaning and maintenance.

Specifications

Circuits	10
Current Capacity	500 mA
Temperature Range*	-40°F to 212°F (-40°C to 100°C)
RPM Rating	6000
Maximum Peak Noise**	0.1Ω
Weight	7.5 oz. (213 g)
* Varies with encoder excitation voltage. (see back) *For operation below 0°F, specify low temperature lubricant."	
** Resistance variation across slip ring contact.	

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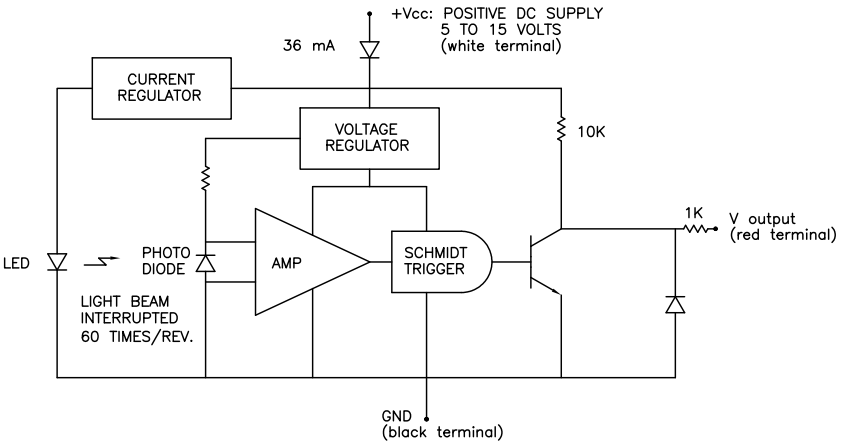
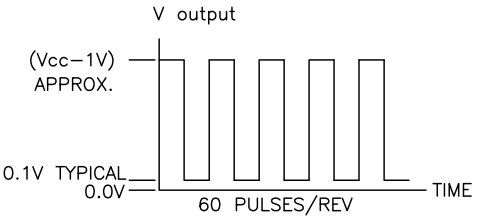
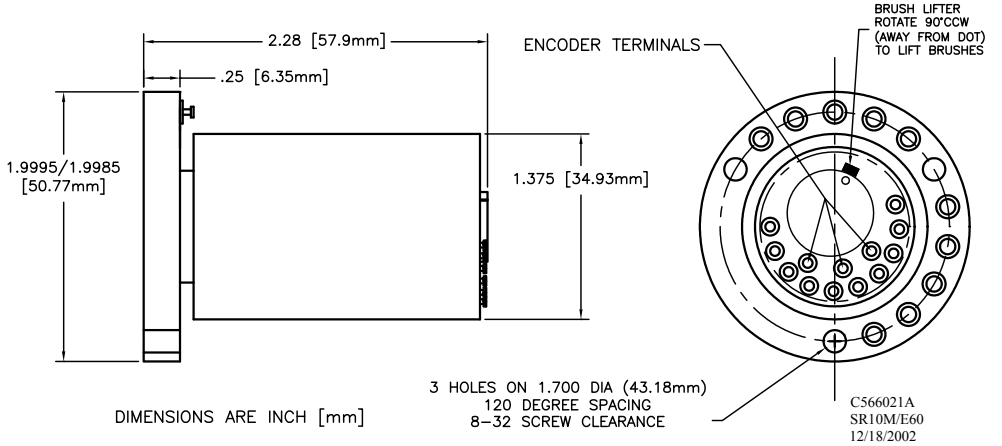
Slip Ring & Encoder Assembly

SR10M/E60 Configuration



Vcc	MAXIMUM OPERATING TEMPERATURES
5V	−40°C TO +100°C (212°F)
10V	−40°C TO +80°C (176°F)
15V	−40°C TO +70°C (158°F)
20V	MAX. ALLOWABLE Vcc
+100°C	ABSOLUTE MAX. STORAGE TEMP.





Mounting

The *SR10M/E60* can easily be mounted to the end of a shaft. Refer to the literature on *SR Series Slip Ring Assemblies* for a detailed drawing and description of the mounting procedure.

Ordering Options

Weatherproof units and accessories are available for applications operating in harsh environmental conditions. For information regarding slip ring accessories, refer to Tech Note 107 section of the catalog.

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Rev. A

Weatherproof Slip Ring & Encoder Assembly

Model SR10AW/E60/A

- 10 circuit weatherproof slip ring
- 60 pulse encoder
- Color coded terminals
- Lightweight and compact
- Permanently lubricated bearings
- Rugged stainless steel construction
- Instrumentation quality rings and brushes

Description

The Michigan Scientific *SR10AW/E60/A Weatherproof Slip Ring and Encoder Assembly* is used for applications requiring both a sealed slip ring and an encoder. It is designed to mount on the end of a rotating shaft, and make an electrical connection to strain gages, thermocouples, or other rotating sensors, while simultaneously providing pulses to measure rotational speed. Specially designed seals provide complete weatherproof protection from water, dust, and other contaminants. The slip ring brushes and rings are made of precious metals, which minimize noise and enable the assembly to be used for low level instrumentation signals.

The *SR10AW/E60/A* accepts up to 10 circuit connections and incorporates a pulse encoder that enables rotational speed to be measured. The encoder generates a 60 pulse per revolution square wave signal with a range of 0 to 6000 RPM. Since the pulses per second are equivalent to RPM, rotor speed can be recorded directly from a frequency display without scale conversion. Analog output signals for rotational speed can be obtained by using this slip ring and encoder model with Michigan Scientific's frequency to voltage encoder electronics.

Connections to the slip ring rotor are made through a military style connector. For complete weatherproofing of this assembly, it must be used with a sealed metal cap or rubber boot to protect the terminals on the slip ring stator. Both of these options incorporate a military style connector, enabling all connections to the slip ring and encoder to be made through connectors. In addition, permanently lubricated bearings eliminate the need for routine cleaning and maintenance.

Specifications

Circuits	10
Current Capacity	500 mA
Temperature Range*	-40°F to 212°F (-40°C to 100°C)
RPM Rating	2000 RPM
Maximum Peak Noise**	0.1Ω
Weight	7.5 oz. (213 g)
*For operation below 0°F, specify low temperature lubricant.	
** Resistance variation across slip ring contact.	

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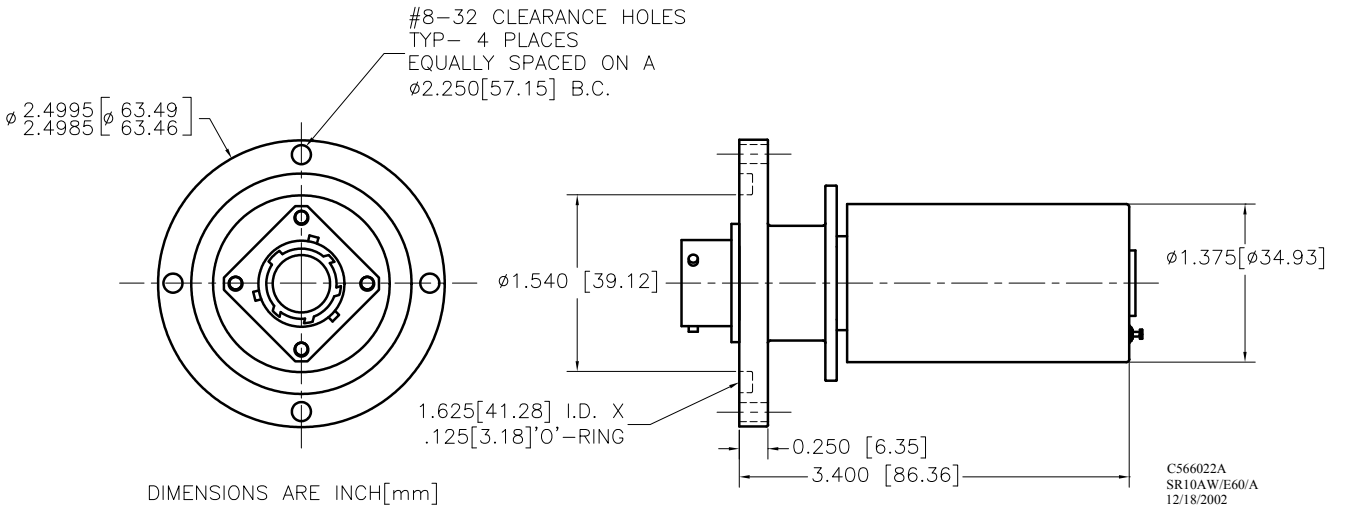
SR10AW/E60/A Configuration



Mounting

The *SR10AW/E60/A* can easily be mounted to the end of a shaft. Refer to the literature in the "Instrumentation Assemblies," and "Price List and Accessories" sections for examples of mounting adapters.

Contact Michigan Scientific for applications where the slip ring assembly is subjected to extreme vibration.

Ordering Options

For information regarding slip ring accessories, refer to Tech Note 107 section of the catalog.

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Rev. A

Slip Ring & Precision Encoder Assembly

Model SR10A/PE512

- 10 circuit slip ring with optical encoder
- 2 outputs of 512 ppr in quadrature
- 1 output of 1 ppr for an index pulse
- All pulses accurate within 5 arc-minutes
- Standard models sealed against dust
- Instrumentation quality rings and brushes
- Weatherproof units available

Description

The Michigan Scientific *Slip Ring and Precision Encoder Assemblies* are used for applications requiring both a slip ring and a precision encoder. These assemblies are available in both standard and weatherproof models. Designed to mount on the end of a rotating shaft, they make electrical connections to strain gages, thermocouples, or other rotating sensors, while simultaneously providing pulses to measure rotational velocity and angular position. The slip ring brushes and rings are made of precious metals, which minimize noise and enable the assemblies to be used for low level instrumentation signals.

This slip ring accepts up to 10 circuit connections and incorporates an optical encoder that generates 2 outputs of 512 pulses per revolution (ppr) in quadrature and a third output of 1 ppr. The quadrature feature detects the direction of rotation, and the 1 ppr is an index pulse used as a reference point when measuring angular position. True shaft position is indicated within 5 arc-minutes, resulting in high accuracy. This is particularly important when making measurements such as torsional vibration, instantaneous velocity, and angular position. Analog output signals for angular position and rotational speed can be obtained by using these models with Michigan Scientific's Frequency to Voltage Encoder Electronics.

Connections to the standard models are made through color coded solder terminals located on both the slip ring rotor and slip ring stator. For the weatherproof models, connections to the slip ring rotor are made through terminals or a military style connector. To provide complete weatherproof protection, the assemblies can be sealed with a rubber boot that protects the terminals on the slip ring stator, or with 3145 RTV silicone. Permanently lubricated bearings eliminate the need for routine cleaning and maintenance.

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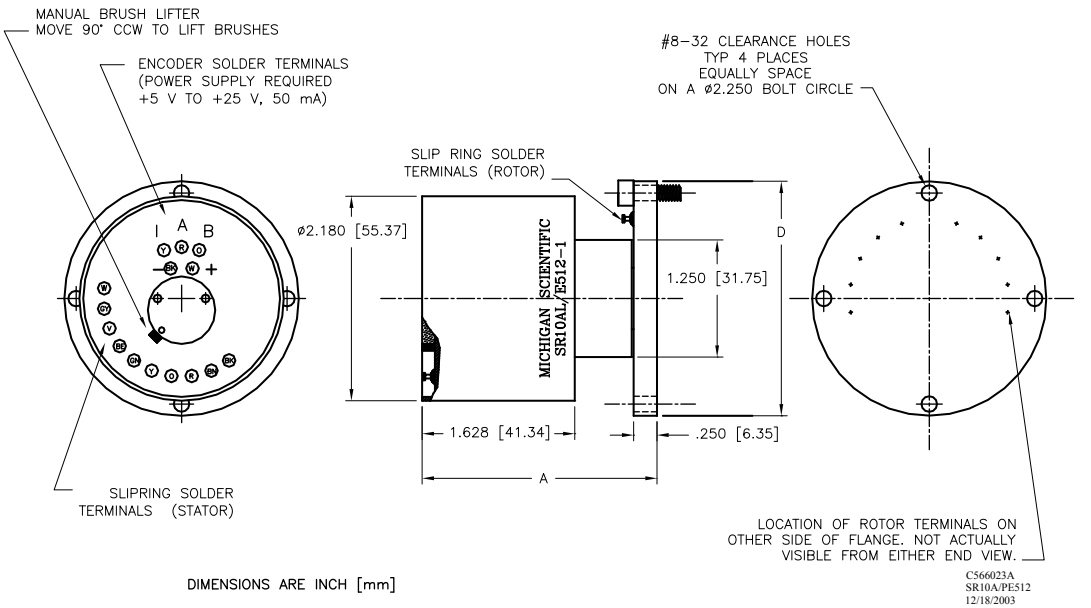
Rev. A

Slip Ring & Precision Encoder Assembly

Specifications

	SR10A/PE512	SR10MW/PE512	SR10AW/PE512/A
Circuits	10	10	10
Current Capacity	500 mA	500 mA	500 mA
Temperature Range*	--40°F to 212°F (-40°C to 100°C)	-40°F to 212°F (-40°C to 100°C)	-40°F to 212°F (-40°C to 100°C)
RPM Rating	10,000	2,000	2,000
Maximum Peak Noise**	0.1 Ω	0.1 Ω	0.1 Ω
Weight	15 oz. (425 g)	15 oz. (425 g)	15 oz. (425 g)
Length "A"	2.51 in (63.8 mm)	3.12 in (79.2 mm)	3.12 in (79.2 mm)
Diameter "D"	2.5 in (63.5 mm)	2.0 in (50.8 mm)	2.5 in (63.5 mm)
Rotor Connections	Terminals	Terminals	Connector
*For operation below 0°F, specify low temperature lubricant			
** Resistance variation across slip ring contact			

SR10A/PE512 Configuration



Mounting

These models can easily be mounted to the end of a shaft. Refer to the literature in the "Instrumentation Assemblies" and "Price List and Accessories" sections for examples of mounting adapters.

Contact Michigan Scientific for applications in which the slip ring assemblies are subjected to extreme vibration.

Ordering Options

The *Slip Ring and Precision Encoder Assemblies* are available with 256, 360, 500, or 512 pulses per revolution. For information regarding slip ring accessories, refer to Tech Note 107 section of the catalog.

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Rev. A

Slip Ring & Rotation Sensor Assembly

SR/ERT Series

- 10, 20, or 36 slip ring connections
- Encoder or resolver rotation sensor
- Additional encoder electronics (built in)
- Available with or without weatherproof seals
- Different rotor styles
- Circular connectors or color coded solder terminals
- Instrumentation quality rings & brushs
- Sealed, corrosion resistant metal housing
- Lightweight and compact
- Quick deliver

Description

The SR/ERT Series is used when slip rings and/or a rotation sensor need to be mounted at the end of a rotating shaft. The gold alloy slip rings are used to make high quality electrical connection to strain gages, thermocouples, or other sensors that have been installed on rotating machinery. Current capacity is 0.5A per connection and the maximum peak resistance variation is 0.1W. The rotation sensor is used to measure rotational velocity, angular position, and direction of rotation. The rotation sensors do not use any of the slip ring connections.

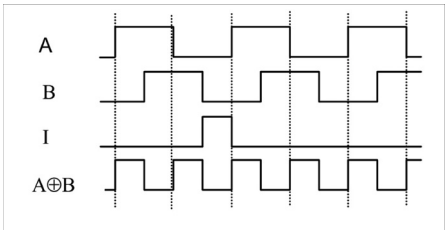
The housings are 3 to 5 inches long, depending on the number of slip rings. They weigh about 15 ounces. The rotors are made from high strength stainless steel. The stators are lightweight, nickel-plated, aluminum. Threaded holes are provided for attaching a rotation restraint. Connection information is permanently engraved on the housing. Circular connectors or solder terminals are offered as wiring terminations. A circular connector is usually specified on the stator. On the rotor, test applications needing a quick disconnect specify circular connectors. If small size is needed, solder terminals are specified on the rotor. In both cases there is also a choice of orientation. For outline drawings, contact Michigan Scientific or visit our web site at www.michsci.com.

All the housings in this series have been designed to accept contacting rotary seals. Units ordered with these seals (choice W) are completely weatherproof and can survive days of total submersion. The seals limit operation to 2000 rpm maximum. Most wet weather applications, like automotive wheels, are within this range. For higher speeds in dry conditions, order units without the contacting rotary seals. Units without seals are capable of the following speeds: 10 rings: 10,000 rpm, 20 rings: 4000 rpm, and 36 rings: 2400 rpm. Unit torque with seals is 21 inch-ounces. Unit torque without seals is 3 inch-ounces. If the application requires a high speed, weatherproof slip ring & encoder, consider units with noncontacting labyrinth seals in the SR/E512 series.

Rotation sensor choices E256, E360, E500, & E512: Four optical encoder resolutions are offered, see the table below. Each of these encoder choices has 4 outputs, shown graphically below. Outputs A and B are in quadrature (exactly 90° out of phase). Output I is an index pulse. Output A⊕B is the exclusive OR of A and B, which doubles the basic resolution of the encoder. The outputs, 0 to 5 volt pulses, can drive TTL loads. The encoders will operate from a +5 to +20 Vdc, 100 mA power supply. Temperature range is -40F to +212F. The encoders have metal code wheels and rugged electronics so they tolerate shock and vibration. They are also protected from incorrect wiring up to 20 volts. Accuracy of encoder systems is 0.25° (maximum cumulative error).

Encoder choices	Outputs:Pulses per revolution A	B	I	A⊕B
E256	256	256	1	512
E360	360	360	1	720
E500	500	500	1	1000
E512	512	512	1	1024

ENCODER OUTPUTS



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Rev. A

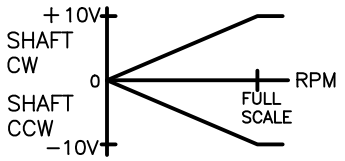
Slip Ring & Rotation Sensor Assembly

SR/ERT Series

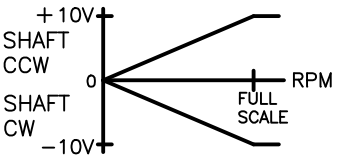
Rotation sensor choices T256, T360, T500 & T512: Additional encoder electronics can be built into the encoder units. The electronics adds two analog outputs, a voltage proportional to shaft velocity (similar to a tachometer) and a voltage proportional to the angular position of the shaft. The analog outputs are easier to record than the digital encoder outputs, which require high sampling rates. Both analog outputs are updated at each pulse of encoder output A, so they are instantaneous, not average values. The encoder electronics will operate from a +6 to 16 Vdc, 400 mA power supply. Temperature range is -40F to +185F.

Full scale for the angular position output is +10V for rotation in either direction.

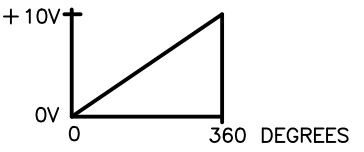
Full scale for the velocity output is +10V for rotation in one direction and -10V for rotation in the opposite direction. Two velocity sensitivities and direction of rotation are usually programmed into each unit. Two pins in the stator connector are designated as option pins, through which the user selects 1 of 4 combinations. For example, units used on our torque wheels are normally programmed to output 10V at 1000 rpm with option pin #1 open. With option pin #1 grounded, full scale is 1800 rpm. Option pin #2 sets the polarity, or direction of rotation, viewing the end of the shaft. With pin #2 open, CW rotation results in a positive velocity output. When pin #2 is grounded, CCW rotation results in a positive velocity output.



VELOCITY OUTPUT WITH OPTION PIN #2 OPEN



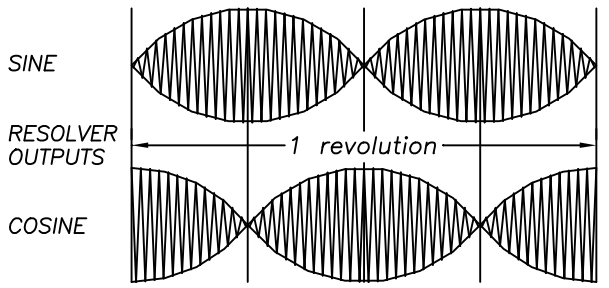
VELOCITY OUTPUT WITH OPTION PIN #2 GROUNDED

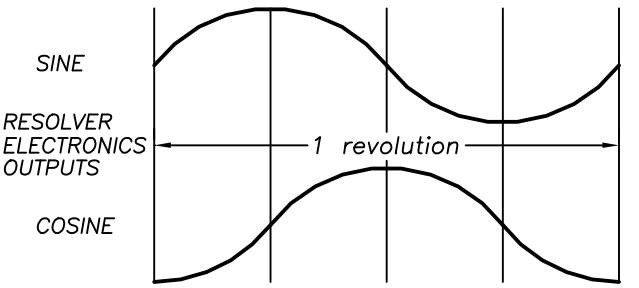


POSITION OUTPUT (0 IS AT INDEX PULSE)

Because the velocity output is like a dc tachometer, we sometimes refer to it as the tachometer circuit. However, unlike a tachometer, there is no commutation ripple, it works down to 0 rpm, linearity and accuracy are better, it is small and lightweight, and the performance does not degrade with use.

Rotation sensor choice R360: A resolver can be specified instead of an encoder. The resolver is an analog rotation sensor with two outputs labeled sine and cosine. The outputs can be passed through the same type of filters as strain gage or other analog sensor signals coming through the slip rings. Then the rotation signal will remain in phase with the sensor signals. The resolver requires additional external electronics for excitation and for processing the outputs. (Michigan Scientific makes resolver electronics, see model RESSC-2-12V in the electronics section of the catalog.) A resolver is an absolute position sensor. Its' angular position is known as soon as the excitation and electronics is turned on, an index pulse does not have to be located before the shaft position can be determined. Temperature range is -40F to +250F. Accuracy of the resolver is 0.25°. System accuracy, which includes the electronics, is within 1°. The resolver option is most often used with 6 axis wheel load transducers.





Ordering information

Part number information can be found in the Tech Note 107 section of the catalog. Part numbers are also on the online drawings, which are on our web site at www.michsci.com

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11/9/13

Rev. A

High Speed Series Slip Ring Assemblies

Model SR45A-AXHS & SR60A-AXHS

- 45 and 60 slip ring connections
- 4000 RPM
- Instrumentation quality rings and brushes
- Rugged stainless steel construction
- Permanently lubricated bearings
- Sealed against dust

Michigan Scientific's *SR60A-AXHS and SR45A-AXHS slip rings* are used for a variety of applications requiring a substantial number of circuit connections. They are designed to mount on the end of a rotating shaft and make electrical connections to strain gages, thermocouples, or other sensors that have been installed on rotating equipment. The slip ring brushes and rings are made of wrought precious metals – no platings are used - which minimizes electrical noise and enables these assemblies to be used for low level instrumentation signals.

Connections to the slip ring assemblies are made through circular connectors located on the slip ring rotor and stator. Permanently lubricated bearings eliminate the need for routine cleaning and maintenance. These slip rings are ideal for use in instrumentation applications where a substantial number of electrical connections are required.

	SR45A-AXHS	SR60A-AXHS
Circuits	45	60
Current Capacity per Circuit	250mA	250mA
Temperature Range*	-40°F to 250°F (-40°C to 121°C)	-40°F to 250°F (-40°C to 121°C)
RPM Rating	4000	4000
Maximum Peak Noise**	.1 Ω	.1 Ω
Weight (approx.)	1.75 lbs (794g)	2 lbs (907g)
Length "A" (see back)	7.150 (181.61)	8.000 (203.20)
** Resistance variation across slip ring contact.		

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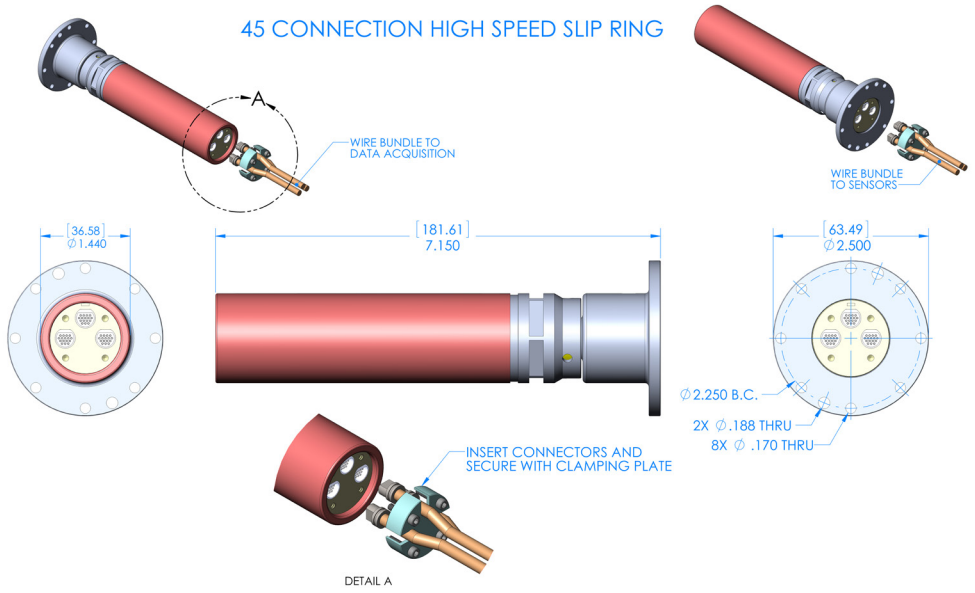
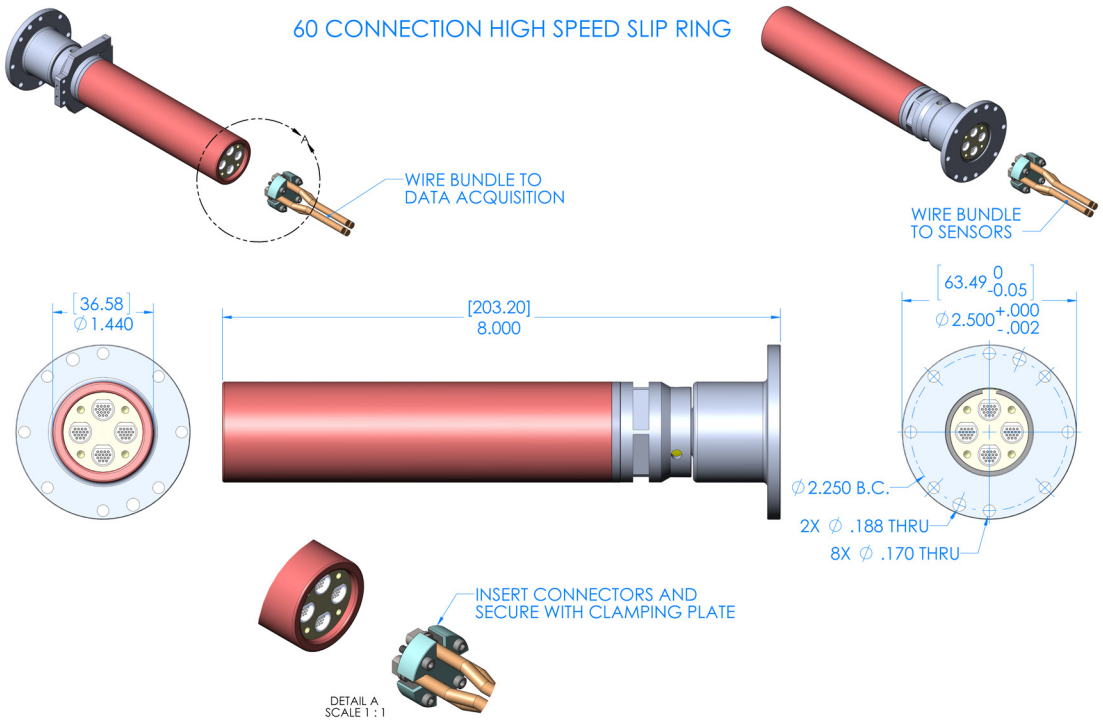
High Speed Series Slip Ring Assemblies

Configurations





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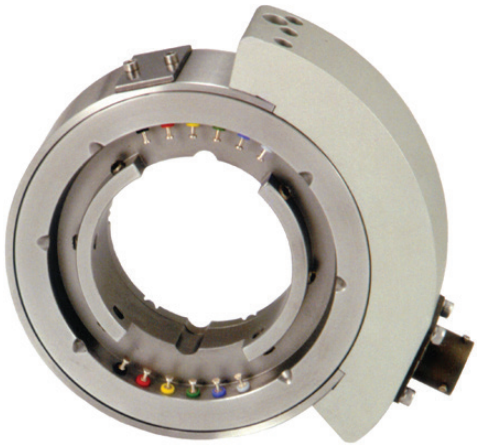
Tubular Slip Ring Assembly

Models B4-2, B6-2

- 4 and 6 circuit slip rings
- Compact design
- Mounts on shafts up to 2” in diameter
- Permanently lubricated bearings
- Rugged stainless steel construction
- Instrumentation quality rings and brushes
- Color coded terminals in tandem provide redundant connections



Description

Michigan Scientific’s *B Series Slip Ring Assemblies* are ideal for applications which require the slip ring to be mounted directly on a rotating shaft. Typically used for automotive drive shaft measurement applications, they are designed to fit on shafts up to 2” in diameter and make an electrical connection to strain gages, thermocouples, or other sensors that have been installed on rotating equipment. The slip ring brushes and rings are made of precious metals which minimize noise and enable the assemblies to be used for low level instrumentation signals.

This *B Series* model is available in 4 or 6 circuit slip ring assemblies. The *B6-2* is particularly useful for drive shaft applications where both torque and axial measurements are needed. In addition, the *B6-2* provides enough circuit connections for use with spinning amplifiers. Locating precision amplifiers on the rotating side of the slip ring greatly improves signal quality because the amplifier is located closer to the sensor. This reduces errors due to long lead wires, connector resistance variations, electro-magnetic interference, and temperature gradients across slip ring contacts.

Connections are made through color coded solder terminals located on the slip ring rotor and a connector on the slip ring stator. Redundant terminals are included to provide back-up connections. The compact width design of these slip rings make them ideal for applications where limited space is available.

Specifications

	B4-2	B6-2
Circuits	4	6
Current Capacity	1A	
Temperature Range	-40°F to 250°F (-40°C to 121°C)	
RPM Rating	7000 RPM	
Maximum Peak Noise*	0.1Ω	
Weight	2.0 lbs (0.9 kg)	
Output Connector	Bendix PT02E-10-6P	
Mating Connector	Bendix PT06E-10-6S (SR)	
* Resistance variation across slip ring contact.		

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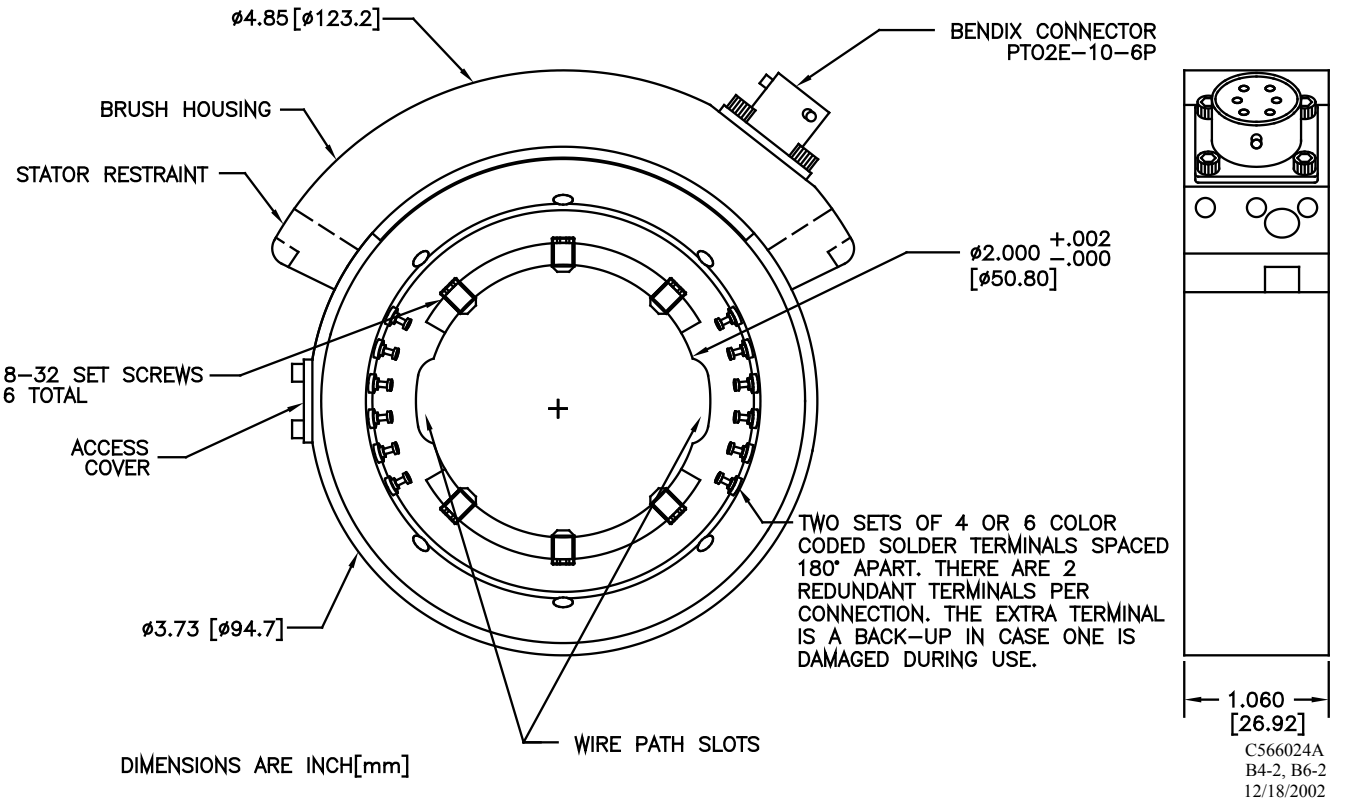
Tubular Slip Ring Assembly

B4-2, B6-2 Configuration



C566024A
B4-2, B6-2
12/18/2002

Mounting

The *B Series Slip Ring Assemblies* can be easily mounted on a shaft. An additional bushing is required when using the slip rings on shafts smaller than 2” in diameter. The slip ring rotor is configured with six #8-32 set screws used for mounting. Proper alignment requires the slip ring to be positioned square and concentric to the shaft rotation axis, particularly for high speed applications. Signal wires from the sensors can be routed along the outside diameter of the shaft. Wire path slots machined into the slip ring rotor enable wires to be mounted under the slip ring and to the color coded solder terminals.

Ordering Options

Special units are available for high speed applications that continuously exceed 7000 RPM. Contact Michigan Scientific for further information.
Mating Bendix connector included. For information regarding slip ring accessories, refer to Tech Note 107.

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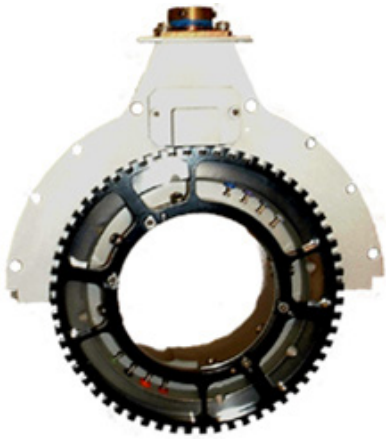
Tubular Slip Ring Assembly

Models B8-2/E60



- 8 circuit slip rings
- Compact design
- Mounts on shafts up to 2” in diameter
- Permanently lubricated bearings
- Rugged stainless steel construction
- Instrumentation quality rings and brushes
- 60 pulse per revolution encoder option

Description

Michigan Scientific’s *B Series Slip Ring Assemblies* are ideal for applications that require the slip ring to be mounted directly on a rotating shaft. Typically used for automotive drive shaft measurement applications, they are designed to fit on shafts up to 2” in diameter and make an electrical connection to strain gages, thermocouples, or other sensors that have been installed on rotating equipment. The slip ring brushes and rings are made of precious metals, which minimize noise and enable the assemblies to be used for low level instrumentation signals.

The *B8-2/E60* is particularly useful for drive shaft applications where both torque and thrust measurements are needed. In addition, the *B8-2/E60* provides enough circuit connections for measuring up to five amplified strain gage or thermocouple signals. Michigan Scientific’s precision strain gage and thermocouple amplifiers, positioned on the rotation side of the slip ring, greatly improve signal quality. They reduce the amount of errors due to long lead wires, connector resistance variations, electro-magnetic interference, and temperature gradients across slip ring contacts.

Connections are made through color coded solder terminals located on the slip ring rotor and a connector on the slip ring stator. Each slip ring assembly includes a 15 ft. cable with a single mating connector attached. The compact-width design of these slip rings make them ideal for applications where limited space is available.

Encoder option

The encoder included in the *B8-2/E60* Tubular Slip Ring Assembly produces a 60 pulse/revolution 5-volt square wave. The TTL compatible signal is produced by a hall-effect sensor, which allows speed to be determined down to 0 rpm. The voltage required to drive the encoder can range from 5.5 to 45 DC volts.

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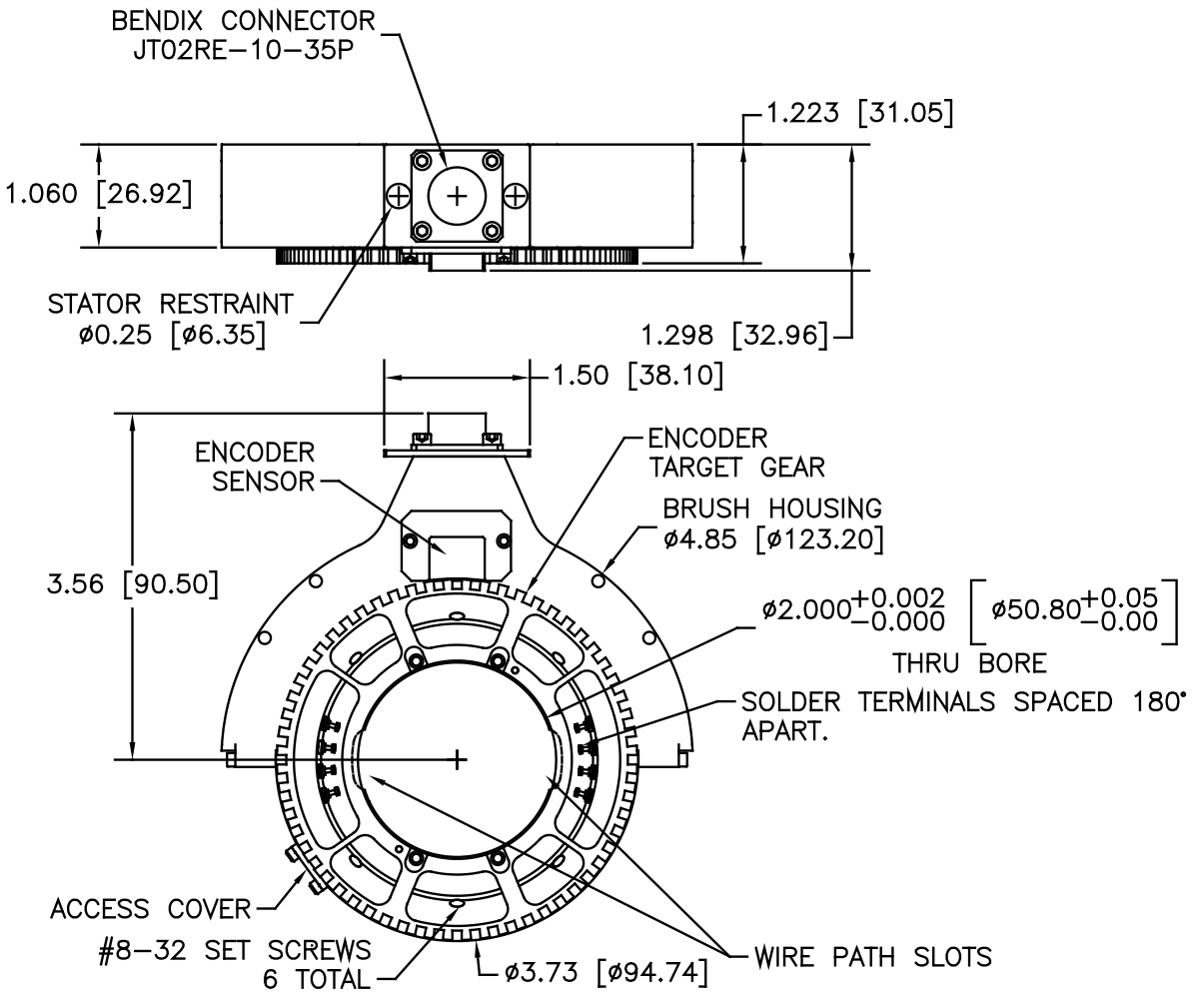
Tubular Slip Ring Assembly

Specifications

	B8-2/E60
Circuits	8
Current Capacity	1A
Temperature Range	-40°F to 250°F (-40°C to 121°C)
RPM Rating	7000 RPM
Maximum Peak Noise*	0.1Ω
Width	1.30 in. (32.96 mm)
Weight	1.9 lbs (0.86 kg)
Output Connector	Bendix JT02RE-10-35P
* Resistance variation across any pair of slip ring contact.	

B8-2/E60 Configuration



15 FT. CABLE WITH MATING CONNECTOR
INCLUDED WITH SLIP RING.

C566025A
B8-2/E60
10/19/2006

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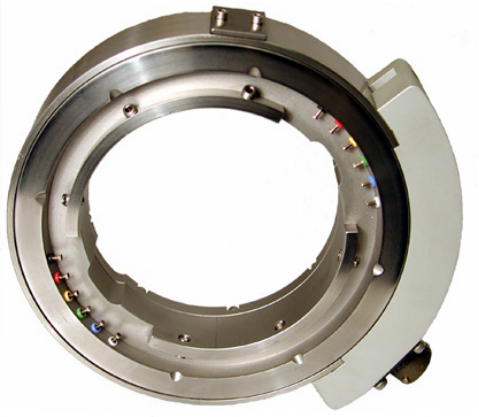
Tubular Slip Ring Assembly

Models B4-3.2, B6-3.2

- 4 and 6 circuit slip rings
- Compact design
- Mounts on shafts up to 3.2” in diameter
- Permanently lubricated bearings
- Rugged stainless steel construction
- Instrumentation quality rings and brushes
- Color coded terminals in tandem provide redundant connections
- Optional light-weight aluminum construction



Description

Michigan Scientific’s *B Series Slip Ring Assemblies* are ideal for applications that require the slip ring to be mounted directly on a rotating shaft. Typically used for automotive drive shaft measurement applications, these slip rings are designed to fit on shafts up to 3.2” in diameter, and to make electrical connection to strain gages, thermocouples, or other sensors that have been installed on rotating equipment. The slip ring brushes and rings are made of precious metals which minimize noise and enable the assemblies to be used for low level instrumentation signals.

This *B Series model* is available in 4 or 6 circuit slip ring assemblies. The *B6-3.2* is particularly useful for drive shaft applications where both torque and axial measurements are needed. In addition, the *B6-3.2* provides enough circuit connections for use with spinning amplifiers. Locating precision amplifiers on the rotating side of the slip ring greatly improves signal quality because the amplifier is located closer to the sensor. This reduces errors due to long lead wires, connector resistance variations, electro-magnetic interference, and temperature gradients across slip ring contacts.

Connections are made through color coded solder terminals located on the slip ring rotor and a connector on the slip ring stator. Redundant terminals are included to provide back-up connections. The compact width design of these slip rings make them ideal for applications where limited space is available.

Specifications

	B4-3.2	B6-3.2
Circuits	4	6
Current Capacity	1A	
Temperature Range	-40°F to 250°F (-40°C to 121°C)	
RPM Rating	4500 RPM continuous; 6000 RPM bursts	
Maximum Peak Noise*	0.1Ω	
Width	1.06 in (26.9 mm)	
Weight of Stainless Steel Unit	2.3 lbs (1.04 kg)	
Output Connector	Bendix PT02E-10-6P	
Mating Connector	Bendix PT06E-10-6S (SR)	
* Resistance variation across any pair of slip ring contact.		

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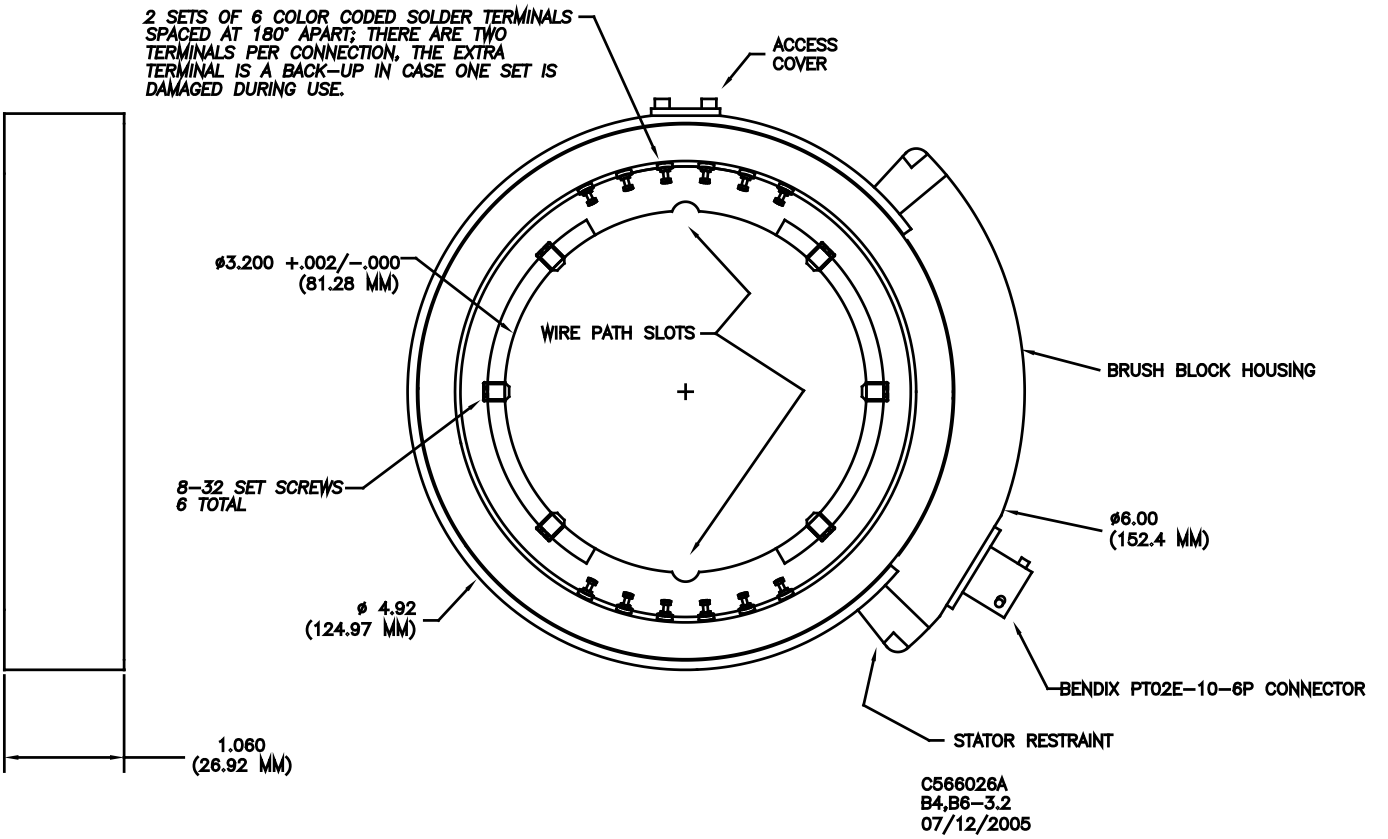
Tubular Slip Ring Assembly

B4-3.2, B6-3.2 Configuration



Mounting

The *B Series Slip Ring Assemblies* can be easily mounted on a shaft. An additional bushing is required when using the slip rings on shafts smaller than 3.2” in diameter. The slip ring rotor is configured with six #8-32 set screws used for mounting. Proper alignment requires the slip ring to be positioned square and concentric to the shaft rotation axis, particularly for high speed applications. Signal wires from the sensors can be routed along the outside diameter of the shaft. Wire path slots machined into the slip ring rotor enable wires to be mounted under the slip ring and to the color coded solder terminals.

Ordering Options

Special units are available for high speed applications that continuously exceed 7000 RPM. Contact Michigan Scientific for further information.

Mating Bendix connector included. For information regarding slip ring accessories, refer to Tech Note 107.

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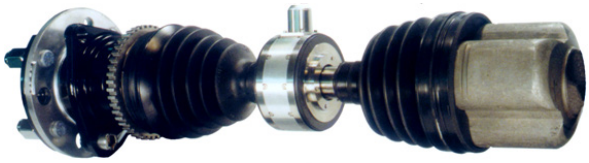
Weatherproof Tubular Slip Ring Assembly

Model B7-T-1.2W

- Ideal for automotive half shaft
- Mounts on shafts up to 1.2” in diameter*
- Optional 60 pulse encoder
- Optional strain gage amplifier**
- Rugged stainless steel construction
- Permanently lubricated bearings
- Instrumentation quality rings and brushes

*bores available to 1.418”
**see BA-T-1.2W literature sheet for specification



Description

Michigan Scientific’s *B7-T-1.2W Weatherproof Slip Ring Assembly* is ideal for applications that require a slip ring to be mounted directly on a rotating shaft. The *B7-T-1.2W* was designed to make long-term, all-weather (not submersible), torque measurements on automotive half shafts, but can be used in other applications with a shaft up to 1.2” in diameter (larger bores are available, consult factory). The slip ring sealing system protects against water spray, grit, dust, mud, slush, and snow.

Connections to strain gages, thermocouples, and other sensors are made via color-coded solder terminals located on the slip ring rotor. Each slip ring assembly includes a 15 ft stator cable with a protective rubber boot for the connector at the slip ring.

Encoder option

The encoder included in the *B7-T-1.2W/E60 Tubular Slip Ring* produces a 60 pulse/revolution 5-volt square wave. The TTL compatible signal is produced by a hall-effect sensor, which allows speed to be determined down to 0 m.p.h. The voltage required to drive the encoder can range from 5.5 to 45 DC volts.

Specifications

	B7-T-1.2W	B7-T-1.2W-AL*
Circuits	7	
Current Capacity	1A	
Temperature Range, slip ring	-40°F to 300°F (-40°C to 149°C)	
Encoder operating temperature range	-40°F to 300°F (-40°C to 149°C)	
Maximum Peak Noise**	0.1Ω	
RPM Rating	3500 RPM	
Width	2.375 in (60.3 mm)	
Diameter	3.285 in (83.5 mm)	
Weight	2.3 lbs (1.0 kg)	1.6 lbs (0.7 kg)

* A light-weight aluminum model is available.
** Resistance variation across slip ring contact.

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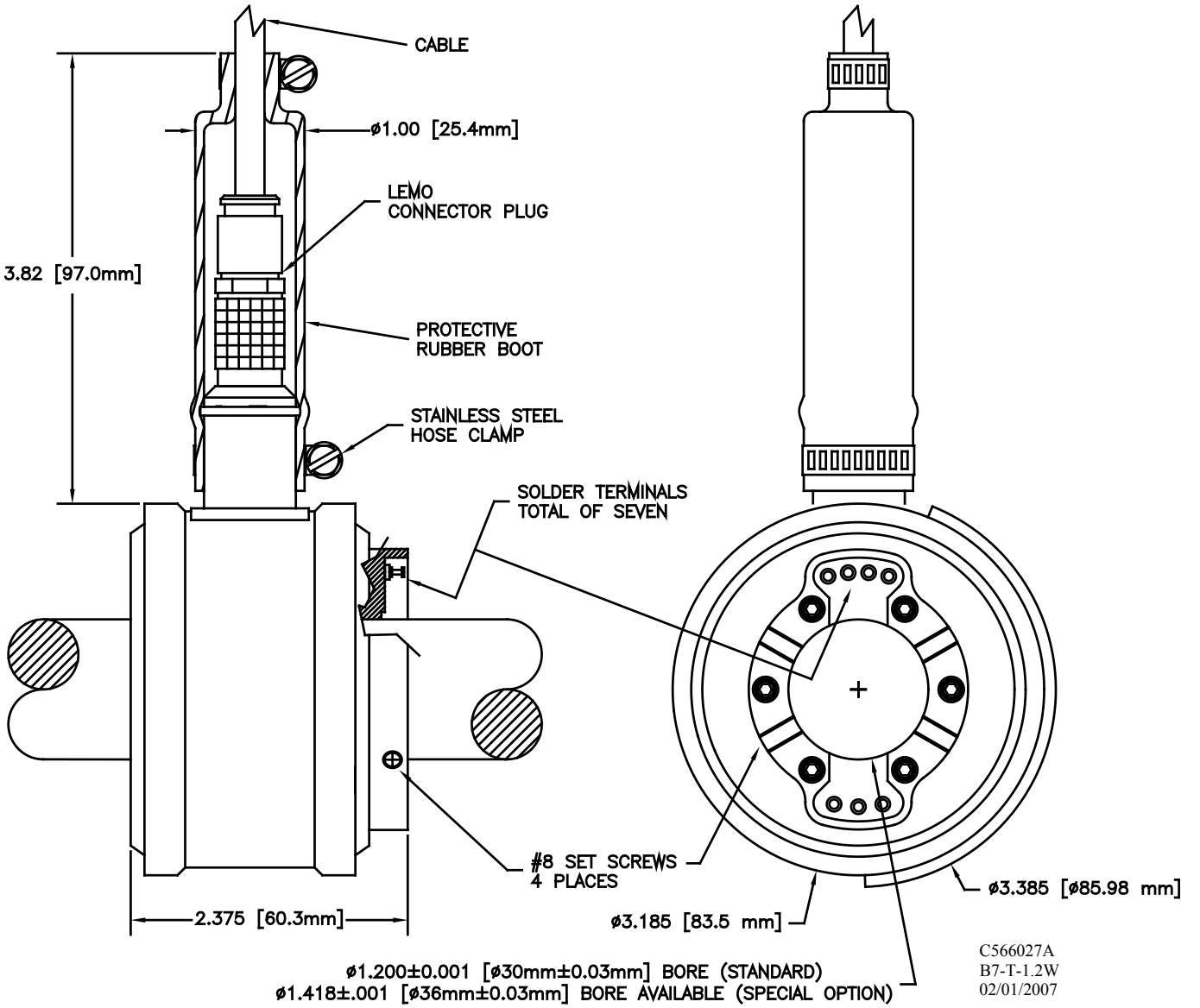
Weatherproof Tubular Slip Ring Assembly

B7-T-1.2W Configuration



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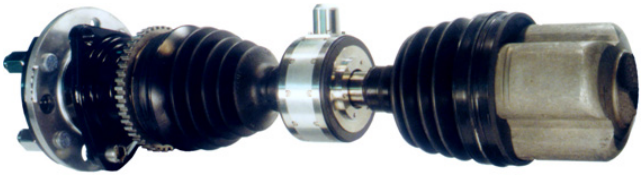
Weatherproof Tubular Slip Ring Assembly

Model BA-T-1.2W

- Ideal for automotive half shaft
- Mounts on shafts up to 1.2” in diameter*
- Optional 60 pulse encoder
- Built-in strain gage amplifier
- Rugged stainless steel construction
- Permanently lubricated bearings
- Instrumentation quality rings and brushes
- High level signal output

*Larger diameter bores available, consult factory



Description

Michigan Scientific’s *BA-T-1.2W Weatherproof Slip Ring Assembly* is ideal for applications that require a slip ring to be mounted directly on a rotating shaft. Designed to make long-term, all-weather (not submersible), torque measurements on automotive half shafts, the *BA-T-1.2W* can be used in other applications with shafts up to 1.2 inch diameter. The slip ring sealing system protects against water spray, grit, dust, mud, slush, and snow.
A major feature of the *BA-T-1.2W* is its built-in strain gage amplifier located on the spinning side of the slip ring. This arrangement greatly improves the signal quality of the system by reducing errors due to long lead wires, connector resistance variations, and electro-magnetic interference.

Four of the seven slip ring circuits in the *BA-T-1.2W* are used to power and control the built-in model *AMP-SG1-M1* amplifier (see product literature of model *AMP-SG1-M1* for features and specifications). Two additional ring circuits are used to transmit a high-level data signal. The seventh ring is for use with an optional configuration that utilizes two built-in amplifiers to provide two high-level data signals. Connections from the strain gage bridge to the amplifier are made via color-coded solder terminals located on the slip ring rotor. Each slip ring assembly includes a 15 ft stator cable with a protective rubber boot for the connector at the slip ring; electronics to power and control the built-in amplifier are sold separately.

Specifications

Circuits	7
Data Channels	2 (high- level output)
Temperature Range, slip ring	-40°F to 300°F (-40°C to 149°C)
Encoder operating temperature range	-40°F to 300°F (-40°C to 149°C)
Amplifier operating temperature range	-67°F to 257°F (-55°C to 125°C)
RPM Rating	3500 RPM
Width	2.375 in (60.3 mm)
Diameter	3.285 in (83.5 mm)
Weight	2.3 lbs (1.0 kg)

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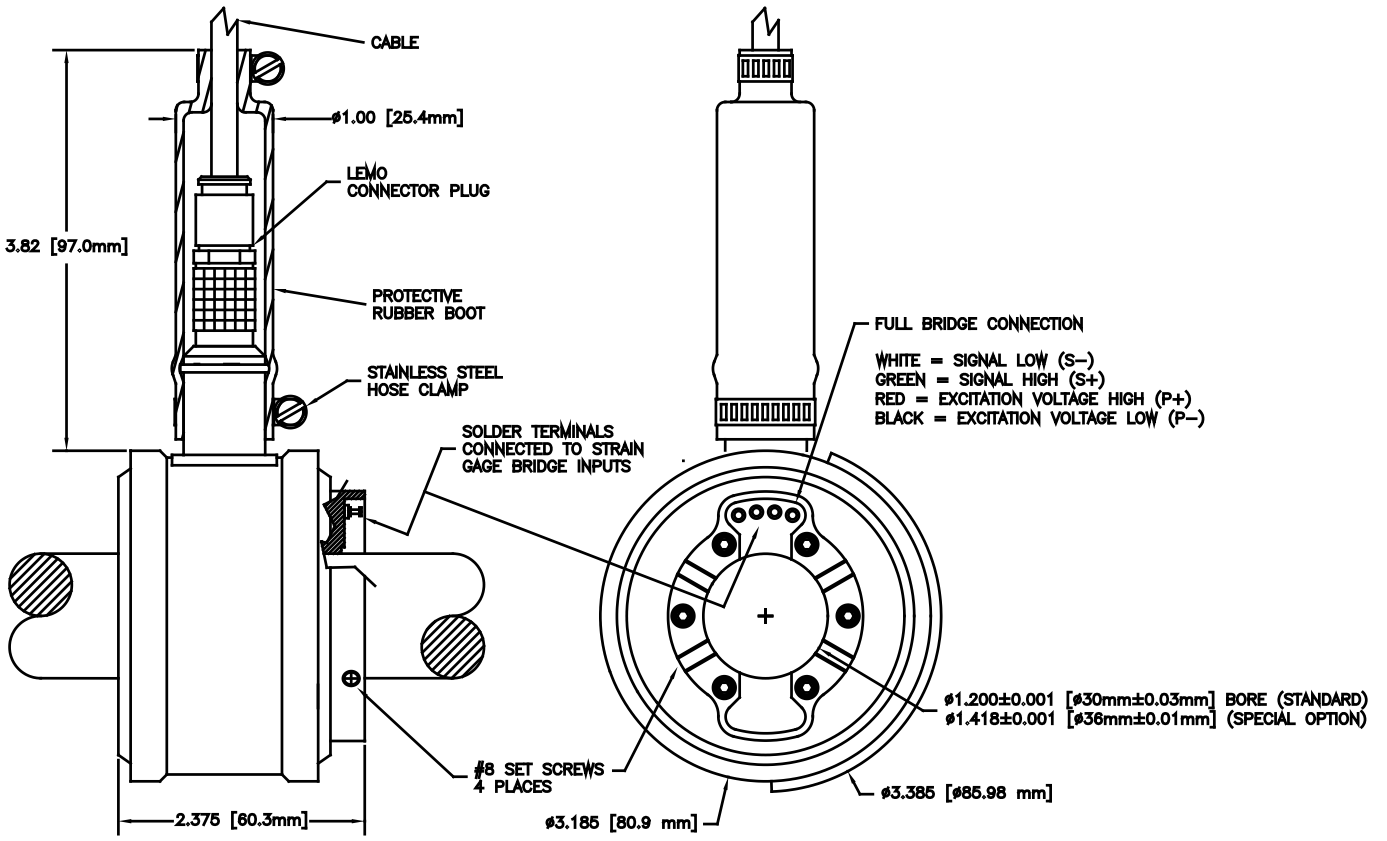
Weatherproof Tubular Slip Ring Assembly

BA-T-1.2W Configuration



NOTE: THE AMPLIFIER BUILT INTO THE ROTOR OF THE SLIP RING ASSEMBLY PROIDES EXCITATION TO THE STRAIN GAGE BRIDGE

C566028A
BA-T-1.2W
02/01/2007

Encoder option

The encoder included in the *BA-T-1.2W/E60* tubular slip ring produces a 60 pulse/revolution 5-volt square wave. The TTL compatible signal is produced by a hall-effect sensor, which allows speed to be determined down to 0 rpm. The voltage required to drive the encoder can range from 5.5 to 45 DC volts.

Thermocouple amplifier option is available

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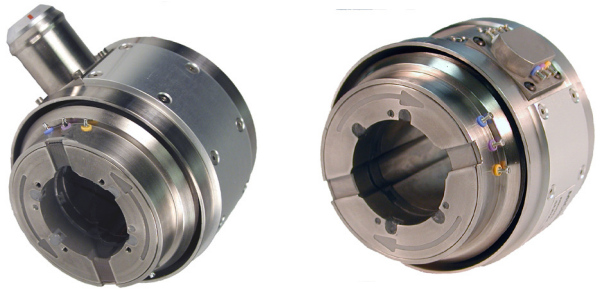
Weatherproof Tubular Slip Ring Assembly

Model B7-1.24W

(smaller diameter for limited space applications)

- deal for automotive half shaft
- Mounts on shafts up to 1.24” in diameter
- Rugged stainless steel construction
- Permanently lubricated bearings
- Instrumentation quality rings and brushes



Description

Michigan Scientific’s *B7-1.24W Weatherproof Slip Ring Assembly* is ideal for applications that require a slip ring to be mounted directly on a rotating shaft. The *B7-1.24W* was designed to make long-term, all-weather (not submersible), torque measurements on automotive half shafts, but can be used in other applications with a shaft up to 1.24” in diameter. The slip ring sealing system protects against water spray, grit, dust, mud, slush, and snow.

Connections to strain gages, thermocouples, and other sensors are made via color-coded solder terminals located on the slip ring rotor. Each slip ring assembly includes a 15 ft stator cable with a protective rubber boot for the connector at the slip ring.

Specifications

	B7-1.24W
Circuits	7
Current Capacity	1A
Temperature Range, slip ring	-40°F to 300°F (-40°C to 149°C)
Maximum Peak Noise**	0.1Ω
RPM Rating	3500 RPM
Width	2.827 in (71.8 mm)
Diameter	2.953 in (75.0 mm)
Weight	2.1lbs (95 kg)
** Resistance variation across slip ring contact. Intermittent speed burst up to 5500 RPM	

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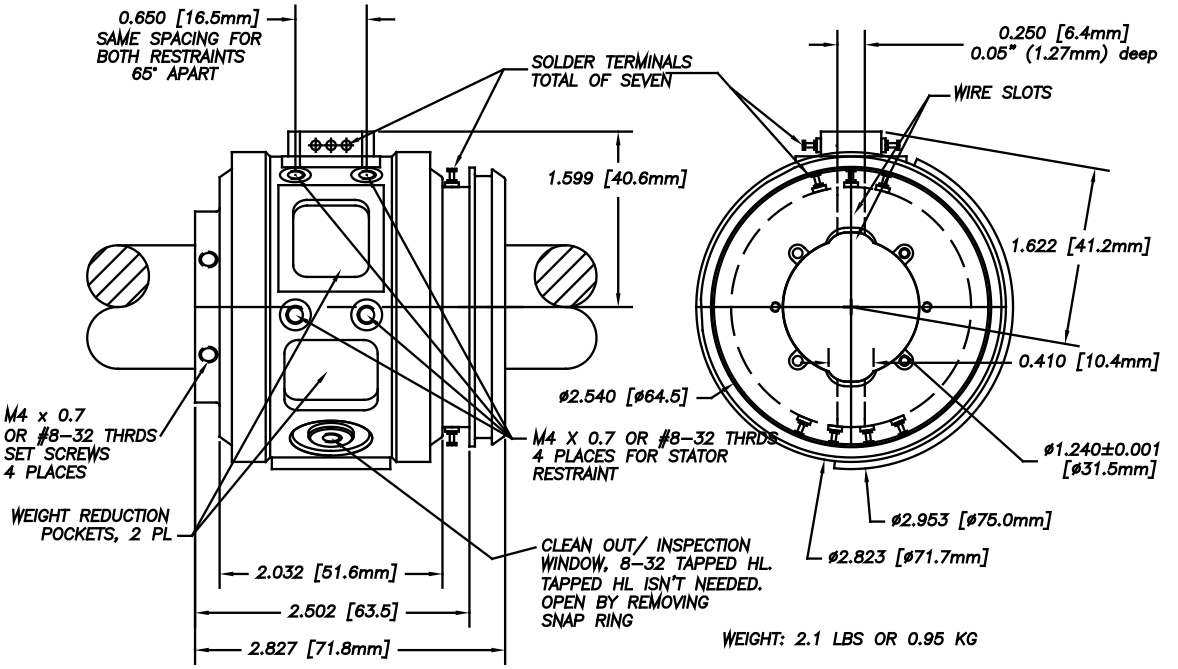
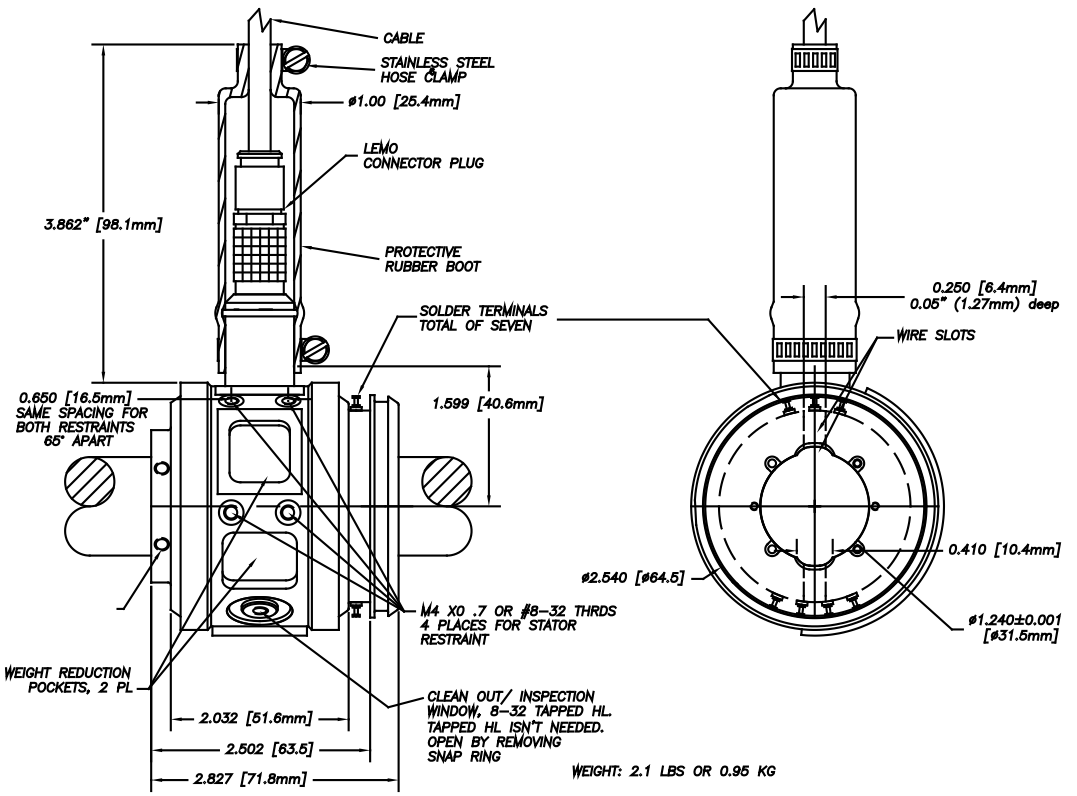
Weatherproof Tubular Slip Ring Assembly

B7-1.24W Configurations

B7–1.24W with solder terminals



B7–1.24W with Lemo connector



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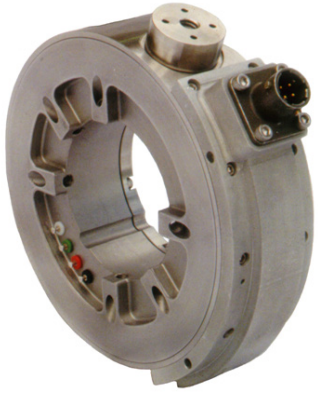
Weatherproof Tubular Slip Ring Assembly

Model B4-2W

- 4 circuit weatherproof slip ring
- Compact design
- Mounts on shafts up to 2” [50.8 mm] in diameter
- Permanently lubricated bearings
- Rugged stainless steel construction
- Instrumentation quality rings and brushes



Description

Michigan Scientific’s *B4-2W Weatherproof Slip Ring Assembly* is ideal for applications that require the slip ring to be sealed and mounted directly on a rotating shaft. Typically used for automotive drive shaft measurement applications, this model employs specially designed seals that provide weatherproof protection from water, mud, snow, dust, and other contaminants. It is designed to fit on shafts up to 2” in diameter and make an electrical connection to strain gages, thermocouples, or other sensors that have been installed on rotating equipment. The slip ring brushes and rings are made of precious metals which minimize noise and enable the assemblies to be used for low level instrumentation signals.

Connections are made through color coded solder terminals located on the slip ring rotor and a connector on the slip ring stator. The compact design of these slip rings make them ideal for applications where limited space is available.

Specifications

Circuits	4
Current Capacity per Circuit	1A
Temperature Range	-40°F to 250°F (-40°C to 121°C)
RPM Rating	7000 RPM
Maximum Peak Noise*	0.1Ω
Width	1.264 in (32.11 mm)
Weight	2.75 lbs (1.25 kg)
Output Connector	Bendix PT02E-8-4P
Mating Connector	Bendix PT06E-8-4S (SR)
* Resistance variation across slip ring contact.	

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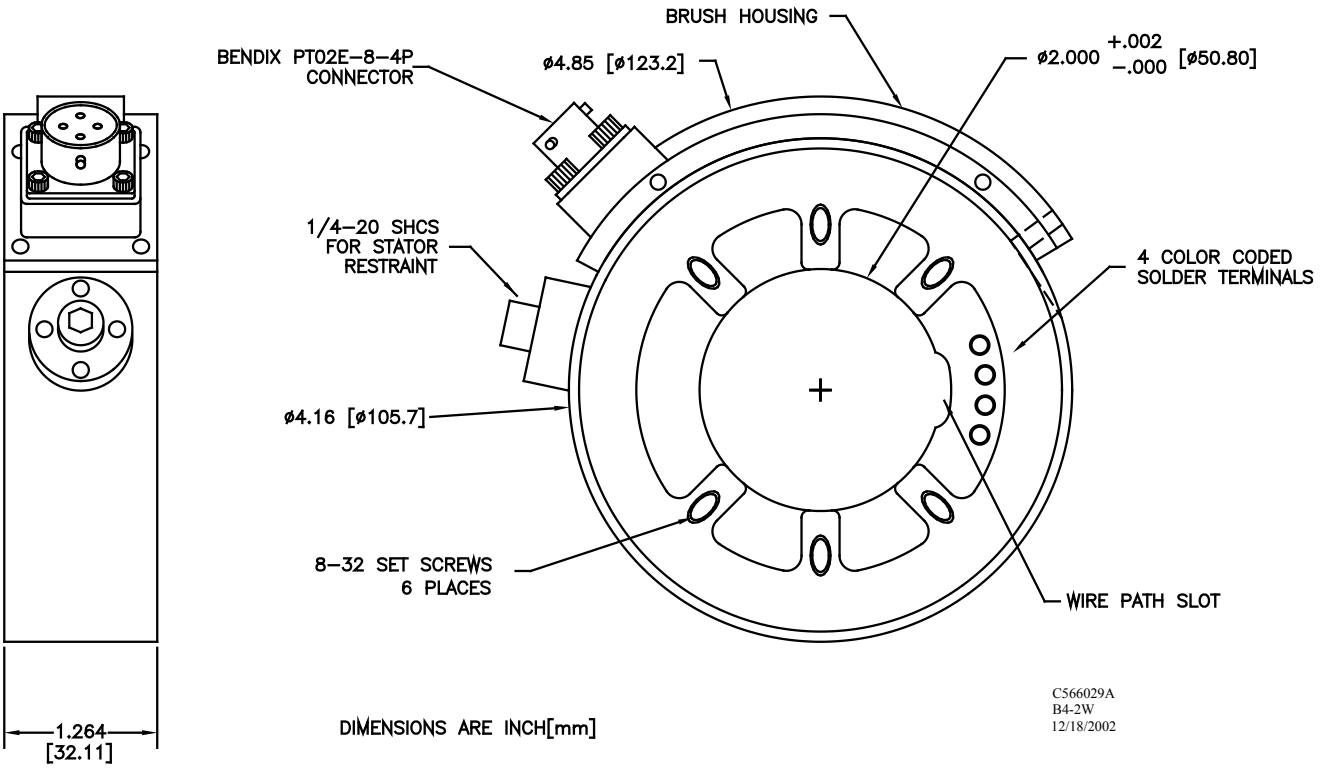
Weatherproof Tubular Slip Ring Assembly

B4-2W Configuration



Mounting

The *B4-2W Slip Ring Assembly* can be easily mounted on a shaft. An additional bushing is required when using the slip rings on shafts smaller than 2” in diameter. The slip ring rotor is configured with six #8-32 set screws used for mounting. Signal wires from the sensors can be routed along the outside diameter of the shaft. A wire path slot is machined into the slip ring rotor, enabling wires to be mounted under the slip ring and to the color coded solder terminals.

Ordering Options

Special units are available for high speed applications that continuously exceed 7000 RPM. Contact Michigan Scientific for further information.

The slip ring rotates in both clockwise and counterclockwise directions; however, an optimal sealing direction may be specified.

Mating Bendix connector included. For information regarding slip ring accessories, refer to Tech Note 107.

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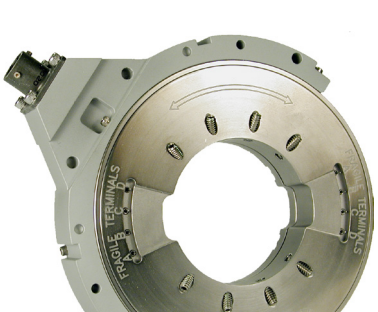
Weatherproof Tubular “Thin” Slip Ring Assembly

Model B4-2WT

- Thin unit - only 0.79”[20 mm] thick
- 4 circuit weatherproof slip ring
- Non-contact labyrinth seals - seals will not wear out
- Mounts on shafts up to 2” [50.8 mm] in diameter
- Permanently lubricated bearings
- Rugged stainless steel construction
- Instrumentation quality rings and brushes



Description

Michigan Scientific’s *B4-2WT Thin Weatherproof Slip Ring Assembly* is ideal for applications that require the slip ring to be sealed and mounted directly on a rotating shaft. Typically used for automotive drive shaft measurement applications, this model employs specially designed seals that provide weatherproof protection from water, mud, snow, dust, and other contaminants. It is designed to fit on shafts up to 2” in diameter and make electrical connection to strain gages, thermocouples, or other sensors that have been installed on rotating equipment. The slip ring brushes and rings are made of precious metals which minimize noise and enable the assemblies to be used for low level instrumentation signals.

Connections are made through solder terminals located on the slip ring rotor and a connector on the slip ring stator. A lower profile terminal plate can be used to replace the stator connector. The compact design of this slip ring make it ideal for applications where limited space is available.

Specifications

Circuits	4
Current Capacity per Circuit	1A
Temperature Range	-40°F to 250°F (-40°C to 121°C)
RPM Rating	7000 RPM
Maximum Peak Noise*	0.1Ω
Width	0.790 (20.066 mm)
Weight	2.56lbs (1.16 kg)
Output Connector	Bendix PT02E-8-4P
Mating Connector	Bendix PT06E-8-4S (SR)
* Resistance variation across slip ring contact.	

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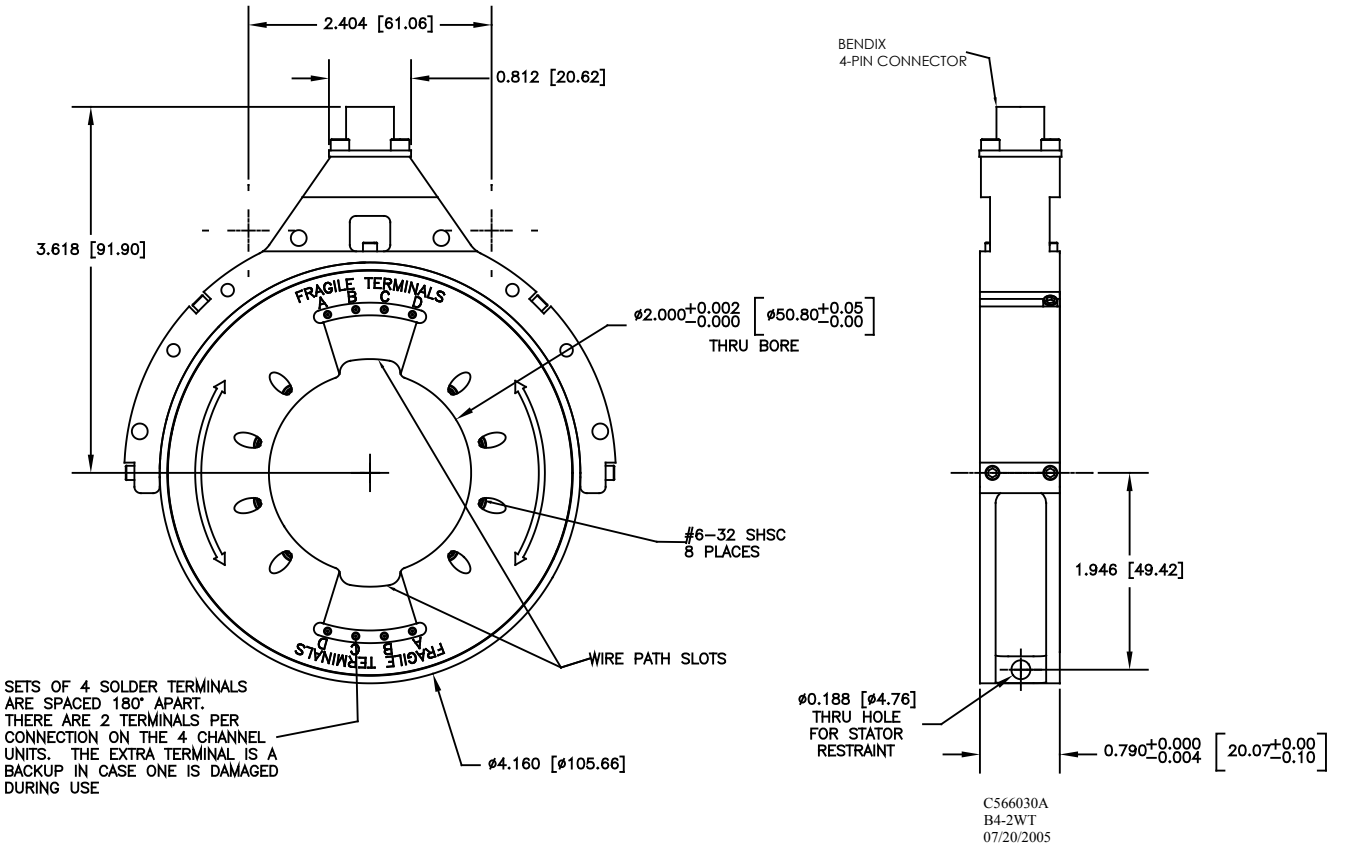
Weatherproof Tubular “Thin” Slip Ring Assembly

B4-2WT Configuration



Mounting

The *B4-2WT Thin Slip Ring Assembly* can be easily mounted on a shaft. An additional bushing is required when using the slip rings on shafts smaller than 2” in diameter. The slip ring rotor is configured with eight #6-32 set screws used for mounting. Signal wires from the sensors can be routed along the outside diameter of the shaft. A wire path slot is machined into the slip ring rotor, enabling wires to be routed under the slip ring and to the solder terminals.

Ordering Options

Special units are available for high speed applications that continuously exceed 7000 RPM. Contact Michigan Scientific for further information.

The slip ring rotates in both clockwise and counterclockwise directions. Mating Bendix connector included. For information regarding slip ring accessories, refer to Tech Note 107..

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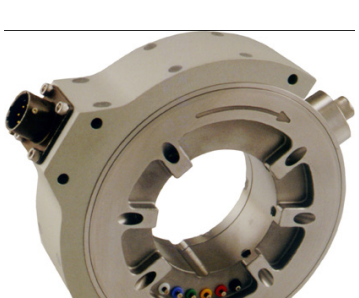
Weatherproof Tubular Slip Ring Assembly

Models B6-2W



- 6 circuit weatherproof slip ring
- Compact design
- Mounts on shafts up to 2” [50.8 mm] in diameter
- Permanently lubricated bearings
- Rugged stainless steel construction
- Instrumentation quality rings and brushes

Description

Michigan Scientific’s *B6-2W Weatherproof Slip Ring Assembly* is ideal for applications that require the slip ring to be sealed and mounted directly on a rotating shaft. Typically used for automotive drive shaft measurement applications, this model employs specially designed seals that provide weatherproof protection from water, mud, snow, dust, and other contaminants. It is designed to fit on shafts up to 2” in diameter and make an electrical connection to strain gages, thermocouples, or other sensors that have been installed on rotating equipment. The slip ring brushes and rings are made of precious metals which minimize noise and enable the assemblies to be used for low level instrumentation signals.

The six circuit capacity of this slip ring allows for more than one full bridge strain gage measurement channel. This is useful for drive shaft applications where both torque and axial measurements are needed. The *B6-2W* also provides enough circuit connections for use with spinning amplifiers. Locating precision amplifiers on the rotating side of the slip ring greatly improves signal quality because the amplifier is located closer to the sensor. This reduces errors due to long lead wires, connector resistance variations, electro-magnetic interference, and temperature gradients across slip ring contacts.

Connections are made through color coded solder terminals located on the slip ring rotor and a connector on the slip ring stator. The compact design of these slip rings make them ideal for applications where limited space is available.

Specifications

Circuits	6
Current Capacity per Circuit	1A
Temperature Range	-40°F to 250°F (-40°C to 121°C)
RPM Rating	7000 RPM
Maximum Peak Noise*	0.1Ω
Width	1.264 in (32.11 mm)
Weight	2.75 lbs (1.25 kg)
Output Connector	Bendix PT02E-10-6P
Mating Connector	Bendix PT06E-10-6S (SR)
* Resistance variation across slip ring contact.	

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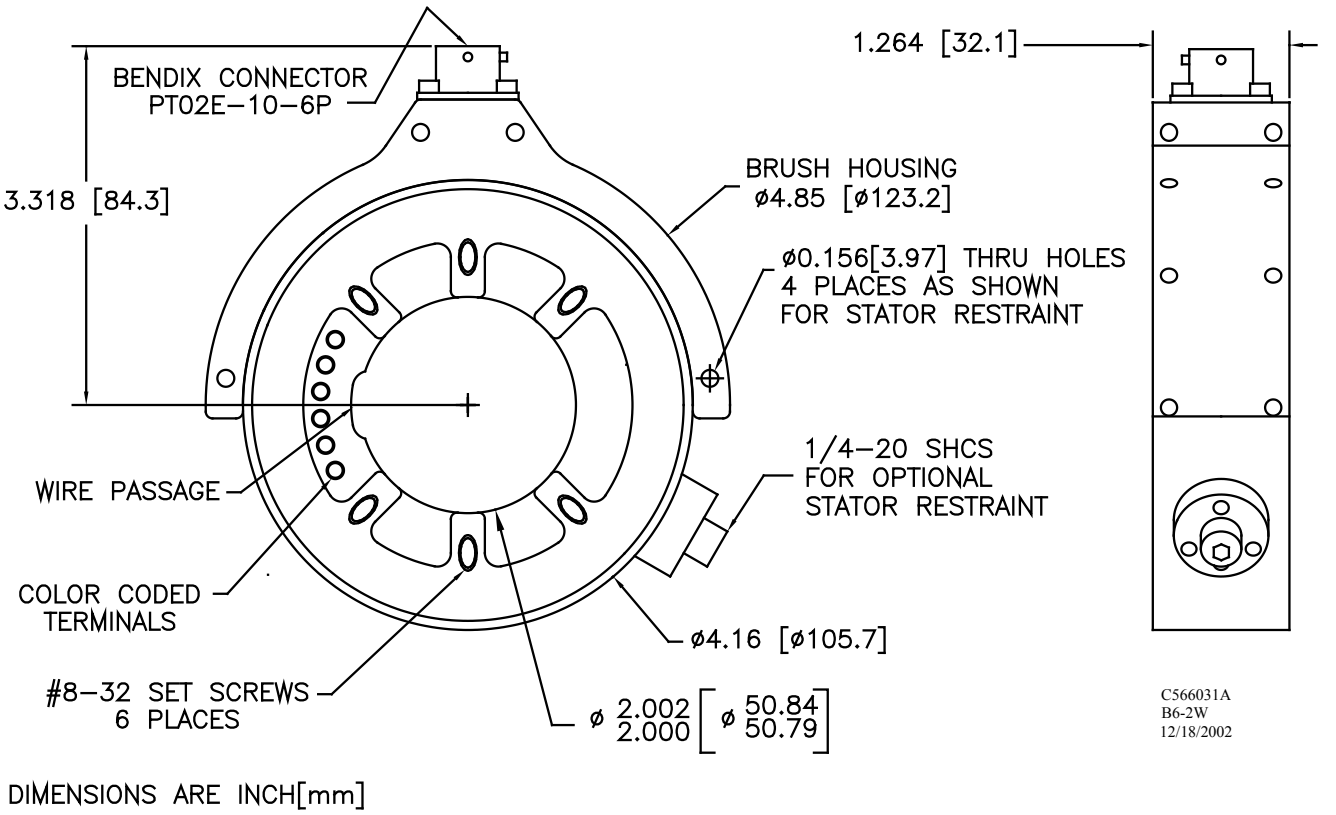
Weatherproof Tubular Slip Ring Assembly

B6-2W Configuration



Mounting

The *B6-2W Slip Ring Assembly* can be easily mounted on a shaft. An additional bushing is required when using the slip rings on shafts smaller than 2” in diameter. The slip ring rotor is configured with six #8-32 set screws used for mounting. Signal wires from the sensors can be routed along the outside diameter of the shaft. A wire path slot is machined into the slip ring rotor, enabling wires to be mounted under the slip ring and to the color coded solder terminals

Ordering Options

Special units are available for high speed applications that continuously exceed 7000 RPM. Contact Michigan Scientific for further information.

The slip ring rotates in both clockwise and counterclockwise directions; however, an optimal sealing direction may be specified.

Mating Bendix connector included. For information regarding slip ring accessories, refer to Tech Note 107.

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Weatherproof Tubular Slip Ring Assembly

Model B6-3.2W

- 6 circuit weatherproof slip ring
- Compact design
- Mounts on shafts up to 3.2” [81.3 mm] in diameter
- Permanently lubricated bearings
- Rugged stainless steel construction
- Instrumentation quality rings and brushes

Description

Michigan Scientific’s *B6-3.2W Weatherproof Slip Ring Assembly* is ideal for applications that require the slip ring to be sealed and mounted directly on a rotating shaft. Typically used for automotive drive shaft measurement applications, this model employs specially designed seals that provide weatherproof protection from water, mud, snow, dust, and other contaminants. It is designed to fit on shafts up to 3.2” in diameter and make electrical connections to strain gages, thermocouples, or other sensors that have been installed on rotating equipment. The slip ring brushes and rings are made of precious metals which minimize noise and enable the assemblies to be used for low level instrumentation signals.

The six circuit capacity of this slip ring allows for more than one full bridge strain gage measurement channel. This is particularly useful for drive shaft applications where both torque and axial measurements are needed. In addition, the *B6-3.2W* provides enough circuit connections for use with spinning amplifiers. Locating precision amplifiers on the rotating side of the slip ring greatly improves signal quality because the amplifier is located closer to the sensor. This reduces errors due to long lead wires, connector resistance variations, electro-magnetic interference, and temperature gradients across slip ring contacts.

Connections are made through color coded solder terminals located on the slip ring rotor, and a connector on the slip ring stator. The compact design of these slip rings make them ideal for applications where limited space is available.

Specifications

Circuits	6
Current Capacity per Circuit	1A
Temperature Range	-40°F to 250°F (-40°C to 121°C)
RPM Rating	4500 RPM continuous; 6000 RPM bursts
Maximum Peak Noise	0.1Ω
Width	1.618 in (41.097 mm)
Weight	2.16 lbs (0.98 kg)
Output Connector	Bendix PT02E-10-6P
Mating Connector	Bendix PT06E-10-6S (SR)
* Resistance variation across slip ring contact.	

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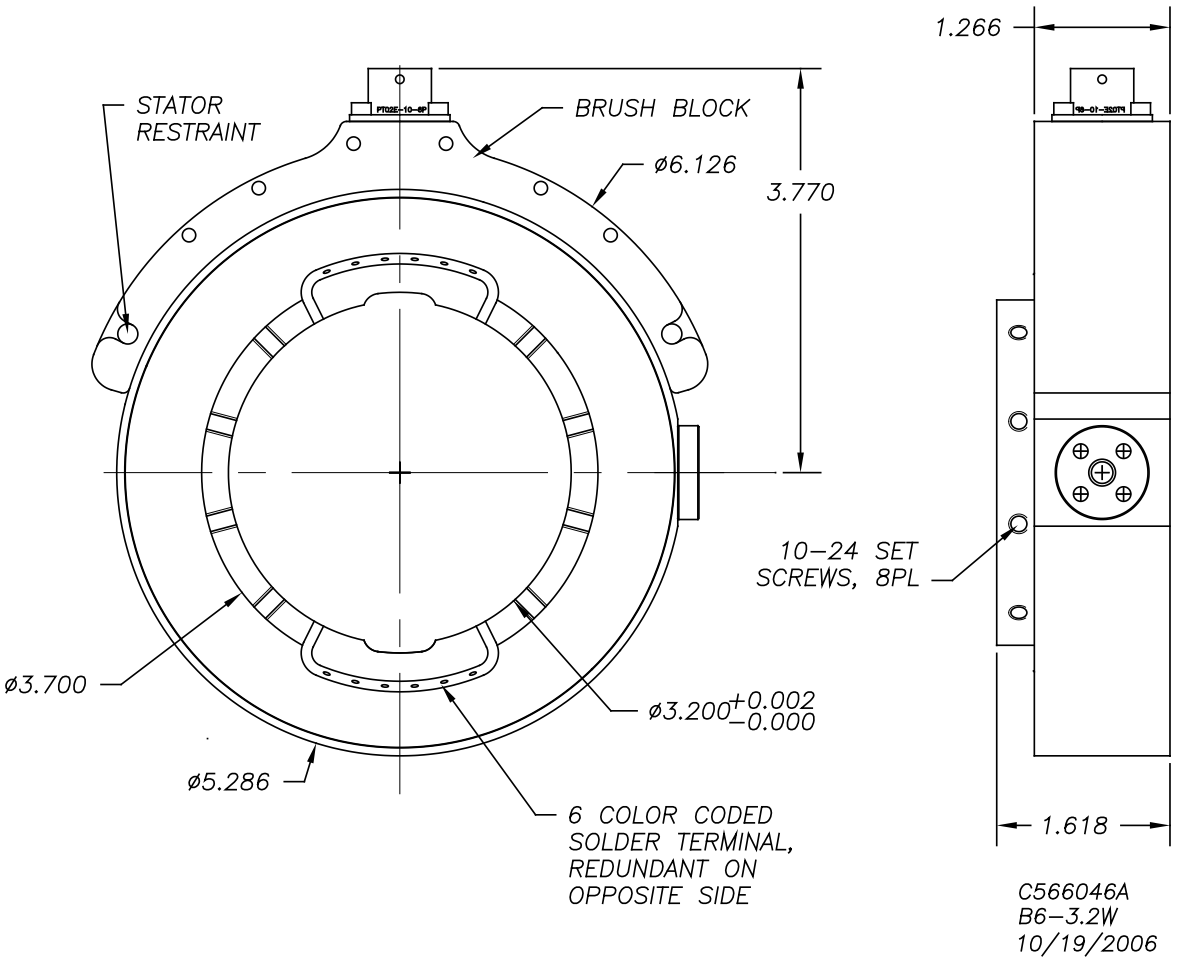
Weatherproof Tubular Slip Ring Assembly

B6-3.2W Configuration



Mounting

The *B6-3.2W Slip Ring Assembly* can be easily mounted on a shaft. An additional bushing is required when using the slip rings on shafts smaller than 3.2” in diameter. The slip ring rotor is configured with eight #10-24 set screws used for mounting. Signal wires from the sensors can be routed along the outside diameter of the shaft. A wire path slot is machined into the slip ring rotor, enabling wires to be mounted under the slip ring and to the color coded solder terminals.

Ordering Options

Special units are available for high speed applications that continuously exceed 7000 RPM. Contact Michigan Scientific for further information.

The slip ring rotates in both clockwise and counterclockwise directions; however, an optimal sealing direction may be specified.

Mating Bendix connector included. For information regarding slip ring accessories, refer to Tech Note 107.

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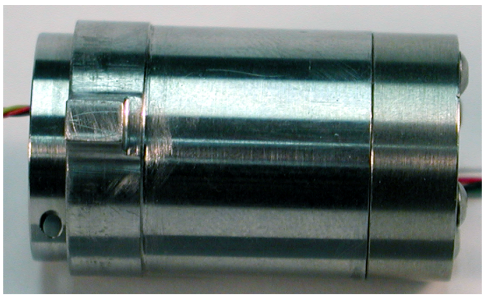
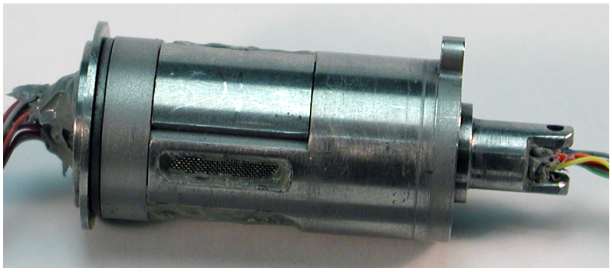
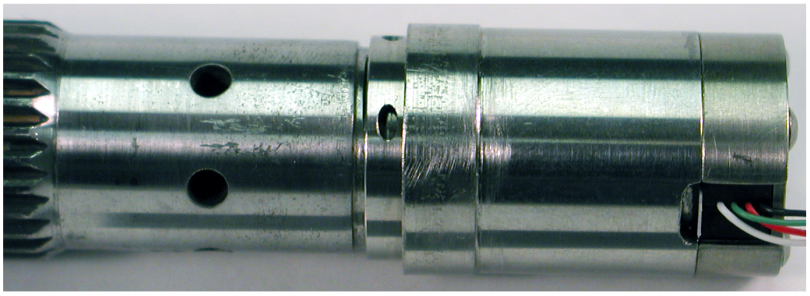
6 CHANNEL SLIP RING
0.890" DIA



10 CHANNEL SLIP RING
0.645" DIA



SLIP RING ATTACHMENT TO END OF TRANSMISSION INPUT SHAFT



SEALED TERMINIALS AT END OF TRANSMISSION INPUT SHAFT - CONNECTED TO STRAIN GAGE TORQUE BRIDGE

TRANSMISSION INPUT SHAFT - STRAIN GAGED AND CALIBRATED TO MEASURE TORQUE

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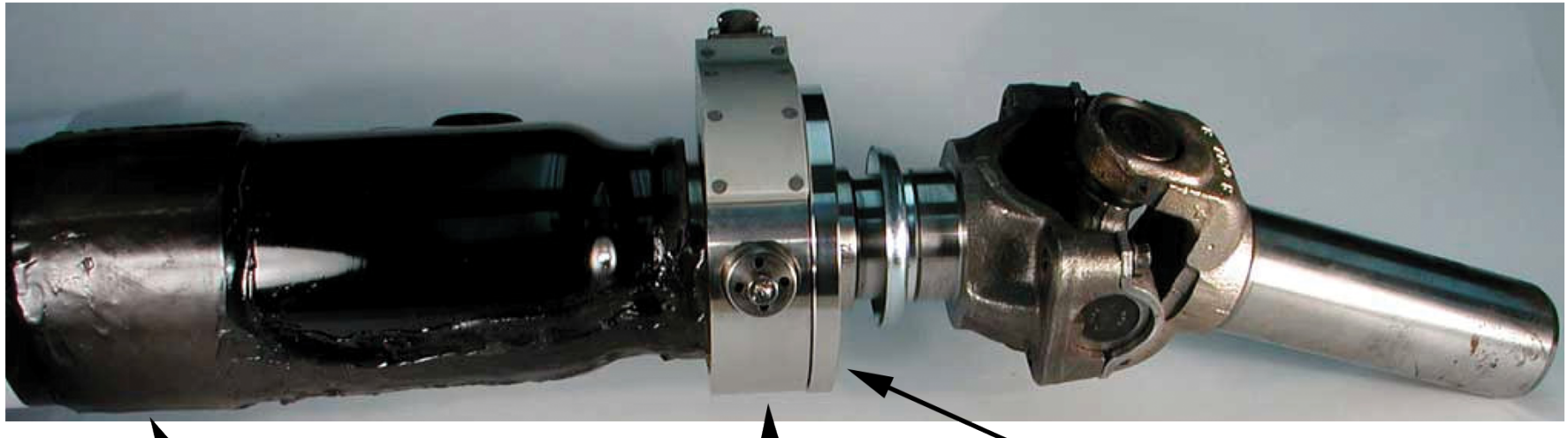
04/13/2005

STRAIN GAGED AND CALIBRATED PROPSHAFT TORQUE TRANSDUCER WITH WEATHERPROOF B6-2W SLIP RING AND SPINNING STRAIN GAGE AMPLIFIER. SLIP RING MOUNTED ON MODIFIED PROPSHAFT TUBE



WEATHERPROOF COATINGS
OVER STRAIN GAGE TORQUE BRIDGE

WEATHERPROOF B6-2W
SLIP RING ASSEMBLY

SPINNING STRAIN GAGE
AND THERMOCOUPLE
AMPLIFIER