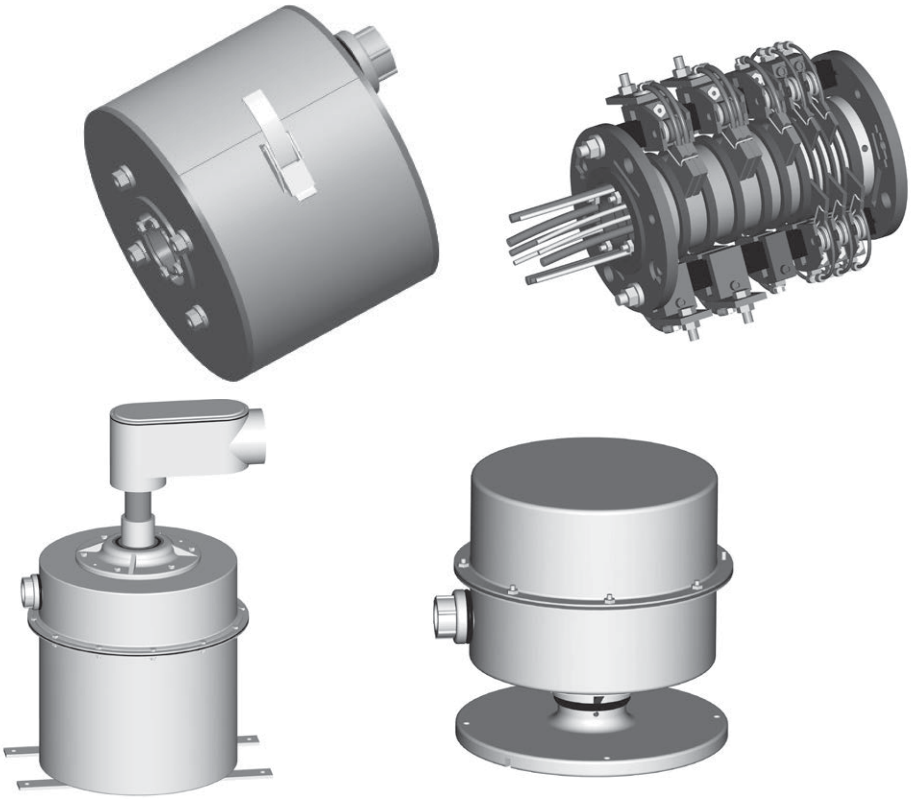
R Series Slip Rings

Installation, Operation & Maintenance Manual



CONDUCTIX wampfler

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SECTION 1 - SAFETY

1.0 Safety Information Responsibility

1.0.1 All owner, operator, and maintenance personnel must read and understand all manuals associated with this product before installation, operation, or maintenance.

1.0.2 The manual provides information on the recommended installation, operation, and maintenance of this product. Failure to read and follow the information provided could cause harm to yourself or others and/or cause product damage. No one should install, operate, or attempt maintenance of this product prior to familiarizing themselves with the information in this manual.

1.1 Safety Messages

The following safety messages are used in this manual to alert you to specific and important safety related information.

CAUTION

CAUTION indicates unsafe actions or situations that have the potential to cause injury, and/or minor equipment or property damage.

DANGER

DANGER indicates hazards that have the potential to cause severe personal injury or death.

WARNING

WARNING indicates unsafe actions or situations that have the potential to cause severe injury, death, and/or major equipment or property damage.

NOTE

NOTE is used to alert you to installation, operation, programming, or maintenance information that is important, but not hazard related.

1.2 Limitation of Liability

1.2.1 All data and information in this mounting instructions have been compiled in compliance with the applicable standards and regulations, best practice and our many years of experience and knowledge.

1.2.2 The manufacturer accepts no liability for damages resulting from:

- Failure to comply with this document
- Improper use
- Use by untrained personnel
- Unauthorized modifications
- Technical changes
- Use of unauthorized replacement parts and accessories
- The actual scope of delivery may differ from the explanations and descriptions provided here if the model in question is a special one, if additional equipped has been ordered or due to recent technical changes.

1.2.3 The obligations agreed upon in the delivery agreement and our General Terms and Conditions of business apply, as do the delivery conditions of the manufacturer and the legal regulations applicable at the time the contract was concluded.

1.2.4 All products are subject to technical modifications in the context of improvement of function and further development.

1.3. Personnel Requirements-Qualifications

WARNING

Inadequately trained persons are at risk of injury!
Improper use can result in serious personal injury or material damage. All activities must only be performed by qualified personnel.

1.3.1 Only persons who can be expected to perform their work reliably are acceptable personnel. People whose reactions are impaired by drugs, alcohol or medications, for example, are not authorized.

1.3.2 When selecting personnel, follow all age- and occupation-specific guidelines applicable at the location of use.

1.3.3 The following qualifications are specified in the operating instructions for certain fields of activity.

1.3.4 Trained personnel and operators

- Will have participated in a training session, given by the owner, on the tasks assigned to them and the potential hazards in case of improper conduct.
- The owner of the machine or system must document that the appropriate training has taken place.

1.3.5 Specialist personnel

- Will consist of persons capable of performing assigned tasks and independently identifying and avoiding potential hazards based on their specialist training, knowledge and experience as well as their knowledge of the applicable regulations. Persons are deemed to be technically qualified if they have successfully completed training as a master electrician, apprentice electrician, electrical engineer or electrical technician. Persons are also considered technically qualified if they have been employed in an appropriate capacity for several years, receiving theoretical and practical training in that line, and their knowledge and skills have been tested by a specialist in the appropriate field of training.
- The machine or system owner must document that the appropriate certificates or other proofs of qualification have been or are being provided.

1.4 Personnel Requirements-Unauthorized Personnel

WARNING

Danger due to unauthorized personnel!
Unauthorized persons who do not meet the requirements described here are not acquainted with the dangers in the working area. Keep unauthorized personnel away from the working area. In case of doubt, address the person and direct them away from the working area. Stop working, as long as unauthorized persons are in the working area.

1.5 Personnel Requirements-Training

1.5.1 Before commissioning the equipment, personnel must be trained by the owner. Log the implementation of training for better traceability.

Example of a training log:

Date	Name	Training Type	Training Instructor	Signature
11/5/2019	John Doe	First safety training for personnel	Dave Miller	

Table: 1-1

1.6 Personal Protective Equipment

1.6.1 For every task, always use:

Safety helmet: For protection against falling or flying parts and materials.

Protective gloves: For the protection of hands against friction, scrapes, puncture or deeper wounds, as well as against contact with hot surfaces.

Protective work clothing: Primarily for protection against entrapment by moving machine parts. Work clothing must be close fitting with a low resistance to tearing; it must have close-fitting sleeves and no protruding parts.

Protective footwear: For protection against heavy failing parts and slipping on slippery floors.

For special tasks, specific protective equipment is required when executing particular tasks:

Safety eye wear: For eye protection against harmful influences such as strong light, chemicals, dust, splinters or weather effects.

Hearing protection: For protection against loud noises and to prevent acoustic trauma.

Breathing mask (FFP-3 - according to country-specific requirements): For protection against materials, particles, and organisms. In this case, for protection against the dust produced by the abrasion of carbon brushes and the PVC insulation of the conductor rail.

1.7 Electrical Warnings

1.7.1 Install and ground the slip ring and the entire unit in accordance with the National Electric Code (NEC) and local codes and/or ordinances.

DANGER

- **Be aware of hazard of electrical shock or burn. Always disconnect the power from the collector ring before attempting any service function. Follow lock out/tag-out procedures as outlined in OSHA section 1910.147 where appropriate. Do not use this slip ring with electrical loads greater than the rated current and voltage.**

1.8 Operational Warnings

1.8.1 Slip rings must be enclosed and protected from any contact by personnel. Means for the provision of this protection is the responsibility of the user. Various enclosure styles are available from Conductix-Wampfler.

WARNING

- **Modification of this equipment may cause excessive wear or failure and will void the warranty. Additionally, modifications may cause safety and fire hazards. Contract the manufacturer regarding any modifications which could affect safety and reliability.**

1.9 Maintenance Warnings

- Exercise care while servicing, adjusting and operating the slip ring.
- Periodically check all fasteners and hardware to ensure tightness.
- Install all mounting fasteners and hardware to ensure tightness under vibration.
- For further questions regarding the use/installation of the R-Series slip ring that are not answered in the manual, please contact us at:

  US: 800-521-4888

  Canada: 800-667-2487

1.10 Specifications and Listings

1.10.1 The R-Series slip ring are built to manufacturer's interpretation of NEC guidelines and UL specifications. They are not generally certified or listed by an independent certifying or regulatory body.

1.10.2 The following specifications apply to all R-Series slip rings (contact Conductix-Wampfler for in-between sizes).

Bore Size (in.)	RPM without Ball Bearings	RPM with Ball Bearings
1.5	125	500
2.5	75	225
4.0	32	125
8.0	25	100

Table:1-2

NOTE:

- **Standard RPM ratings may not apply in all circumstances. Consult factory for special conditions including bore sizes not listed, very large amperage ratings, number of rings, or extreme environments.**

1.10.3 The R-Series slip rings are intended for industrial use and require a permanent mounting means.

1.11 Temperature and Ampere/Voltage Ratings

1.11.1 The R-Series slip ring is rated to withstand a maximum ambient temperature of 220°F (104°C). Connections to the assembly must be sized to the ratings of the circuit (refer to NEC tables 310.15(B)(16), 310.15(B)(17), 310.15(B)(18), 310.15(B)(19), and applicable notes).

1.12 Markings

1.12.1 Every slip ring is marked with a label on the outboard bearing (or enclosure) which includes the Conductix name/logo, product catalog number, and the individual product serial number.

1.12.2 The marking on slip rings include the maximum amperage and voltage, but some circuits may be lower than this maximum and or de-rated as per each wire and or cable gauge sizes and types and or number of circuits.

SECTION 2 - PRODUCT DISPOSAL

2.0 Product Disposal and Recycling

2.0.1 Once the product has reached it's end of life it must be disassembled and disposed of in accordance with local and regional environmental requirements.

2.0.2 In the absence of a return and disposal agreement, disassembled components must be recycled as follows:

- All metallic parts must be sorted and recycled by material type
- All plastic components must be sorted and recycled by material type
- All other components are to be disposed of in accordance with their material composition. Take care with items identified as Substances of Concern.

2.0.3 Local authorities or special disposal companies can provide information about environmentally appropriate disposal.

SECTION 3 - INSTALLATION

WARNING

- **Never support and/or carry unit by core and/or brush leads. Carry/Lift the Slip Ring Unit by supporting outboard bearings, shaft, flange, or enclosure as applicable. Some units may have specific lifting tabs on the enclosure.**

3.0 Application Types

3.0.1 Slip ring assemblies can be purchased with or without an enclosure. Such enclosures are:

- Wrap around brush carriage cover (RAU, RBU)
- Shaft/Flange stationary (Revolving/RU)
- Enclosure stationary (Swivel/SU)
- Explosion Proof revolving enclosure (XRU)
- Explosion Proof swivel with rotating junction box (XSU)

NOTE:

- User must enclose the slip ring assembly appropriately to meet safety codes and to protect the assembly.

3.1 Mounting

3.1.1 General Instructions for all Assemblies

3.1.1.1 Slip ring assemblies are to be mounted on the center axis of the application.

3.1.1.2 Unenclosed slip ring assemblies are made up of two basic components, the brush carriage and the core. The brush carriage is made up of the brush posts, brushes, brush holders, and outboard bearings. The core is made up of the rings, insulators, drive collar, ball or friction type bearings, and leads extending from the end of the outside of the through bore. See **Figure 3-1**

3.1.1.3 The slip ring assembly is through bore design and is to be mounted onto a shaft by the set screws in the drive collar.

3.1.1.4 The slip ring assembly can be operated with either the brush carriage of the slip ring core rotating and the other stationary. One of these elements must be stationary in relationship to the other for proper operation. This is called “driving” the ring.

NOTE:

- The term “driving” is referring to holding stationary or rotating either the brush carriage or the core.

3.1.1.5 The brush carriage on a standard slip ring assembly has drive holes in the outboard bearings. See **Figure 3-2**

3.1.1.6 Unenclosed slip ring assemblies and assemblies with wrap around cover(s) can be installed with either the brush carriage or core rotating. One of these items must be held stationary in relationship to the other for proper operation.

3.1.1.7 On enclosed slip ring assemblies, the brush carriage is driven by enclosure and the core is driven by the shaft. One of these items is to be held stationary in relationship to the other for proper operation.

3.1.1.8 Due to some types of applications and/or the size of the slip ring assembly, the brush carriage may be required to be driven from both ends. Driving the brush carriage from both ends will prevent the carriage from racking or twisting. Special slip ring assemblies may have a special drive arm type device(s) for driving the brush carriage.

3.1.1.9 When driving and to avoid putting strain on the slip ring assembly, the brush carriage or core **MUST** be driven by a “loose link” or “floating” type drive connection or mechanism. Meaning that there is to be “play” between one of the slip ring driven items, which is either the brush carriage or core, and the device that it is driving it.

NOTE:

- The “loose link” or “floating” type drive connection or mechanism is required due to run-out and or deflection that may occur during operation.
- If not followed, premature wear or failure of slip ring assembly will occur. (See 8.0 REPLACEMENT PARTS for optional bolt on drive brackets).

SECTION 3 - INSTALLATION

3.1.2 Unenclosed slip ring assemblies and slip ring assemblies with wrap around covers (RAU/RBU)

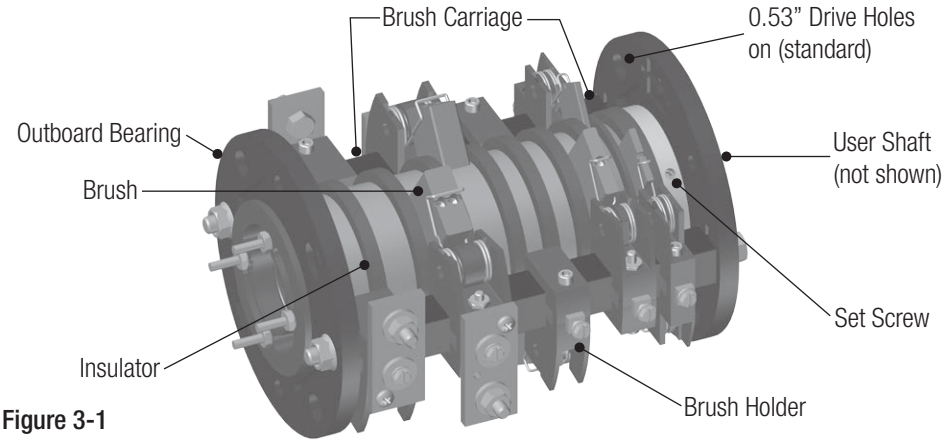
3.1.2.1 Install slip ring assembly on the shaft and lock into place with set screws provided in the drive collar. The mounting shaft must extend at least 80% of the length of the slip ring assembly core. It is recommended to dog point the shaft for the drive collar set screws when mounting the assembly onto the shaft to prevent the core from coming loose. This is recommended for 2.5" Bore or larger, or applications where extreme speed/torque/vibration are present. Do this by positioning the slip ring on the shaft and marking the set screw holes. Then use a drill bit close to the same size as the set screw to dimple the shaft and prevent screw slippage. On slip ring assemblies with a 2.5 inch through bore or larger, a key-way slot in the drive collar is also provided to reduce chance of the drive collar slipping on the shaft. Always use thread locking compound.

3.1.2.2 When driving the slip ring assembly, locate the torque arm, bar, pin, bolt, or suitable member to loosely capture the drive holes in the outboard bearings or drive slot along the outside of the brush carriage. To avoid putting strain on the assembly, the drive connection must be a "looselink" or "floating" type drive connection. Because of the run-out and/or deflection that may occur during operation, there is to be "play" between the slip ring driven item and the device that is driving it.

3.1.2.3 Make electrical connections at lugs on the brush holders and at the ends of core lead wires, buss bars, or at the core lead terminal shaft. Core leads may be cut to desired length at time of installation. If equipped with wrap around cover, route brush leads through the side of the assembly (NPT hub if provided) and connect brush holders or terminal strips. Be sure electrical connections to the brush holders do not interfere or exert tension on the brush holders and/or carriage assembly. We recommend using flexible wire for brush and core lead terminations. All wire sizes and types must be appropriate to the required amperage and voltage (refer to NEC tables 310.15(B)(16), 310.15(B)(17), 310.15(B)(18), 310.15(B)(19) and applicable notes).

WARNING

- **During installation of the slip ring, proper air gap must be maintained between conductive items, and all terminal connections. Refer to U.L. 508C standards.**



Bore	B.C.
1-1/2"	4-1/2"
2-1/2"	8-1/4"
4"	12-3/8"
8"	16"

Consult factory for special or other bore sizes.

Figure 3-1

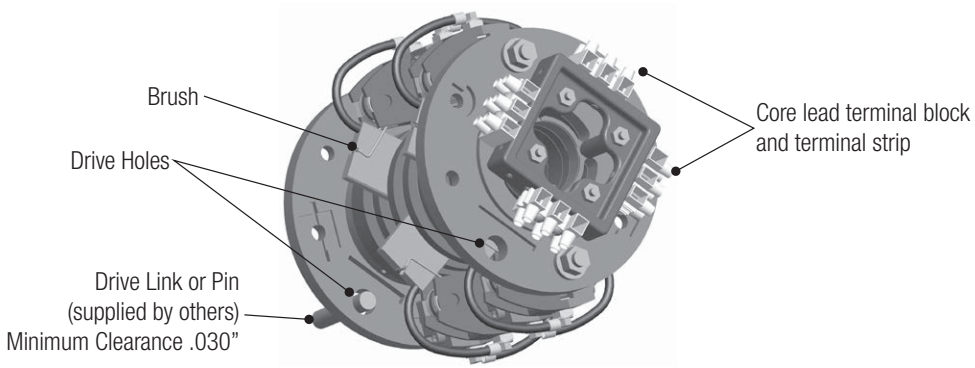


Figure 3-2

SECTION 3 - INSTALLATION

3.1.3 Slip Ring in Revolving Enclosure (RU)

3.1.3.1 Mount the assembly by either the shaft flange or internal threads at end of shaft to rotating or stationary point. Can be mounted with either the enclosure or shaft/flange rotating.

3.1.3.2 Slip ring is accessed by removal of enclosure cover.

3.1.3.3 Electrical leads to brush carriage of slip ring come through the side of enclosure (NPT hub if provided) and connect to screw or bolt connectors on brush holders or terminal strips. Electrical lead connections to the core, come through the middle of the shaft and connect to core leads of the Slip Ring. **See Figure: 3-3**

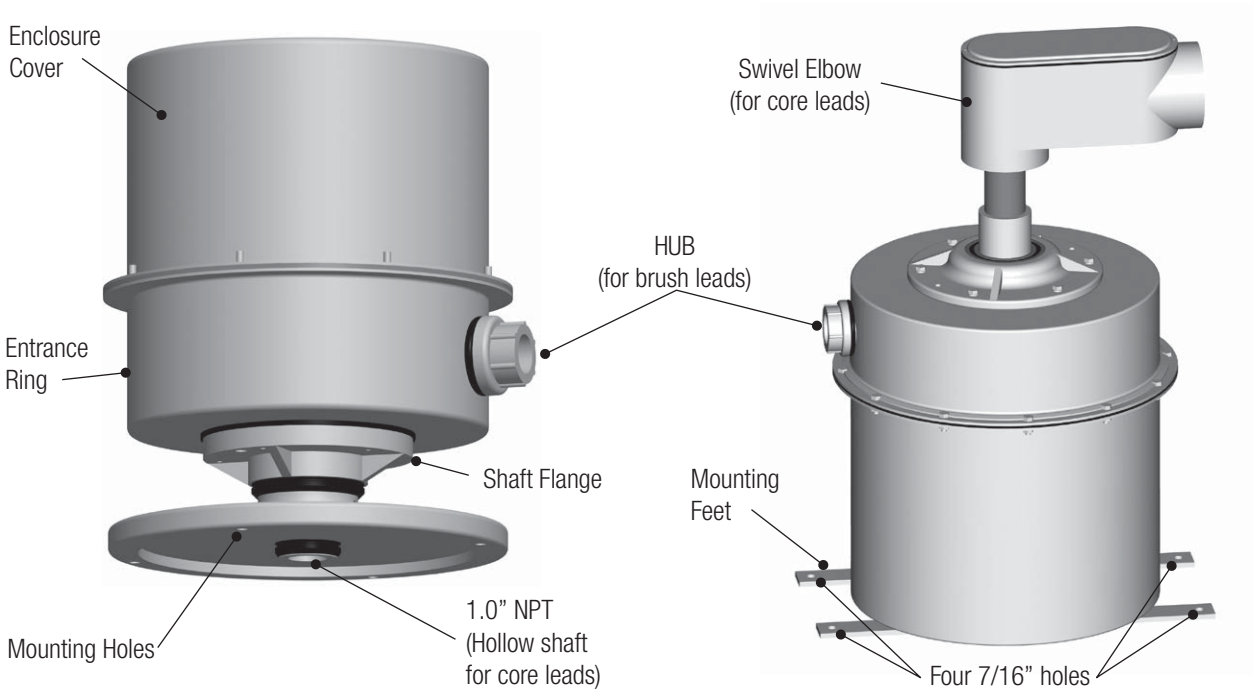
3.1.4 Slip Ring in Swivel Enclosure (SU) (RAQ/RBQ)

3.1.4.1 Mount the enclosure using the mounting straps or mounting flange provided. The assembly can be operated with either the enclosure or swivel rotating.

3.1.4.2 Slip ring is accessed by removal of enclosure cover.

3.1.4.3 Connect core electrical leads through the swivel elbow provided. Swivel elbow is either held stationary or rotated with a suitable link mechanism such as mechanical or conduit connection.

3.1.4.4 Electrical leads to brush carriage of slip ring come through the side of the enclosure (NPT hub if provided) and connect to brush holders and/or terminal strips. **See Figure: 3-3**



RU Enclosure **SU ENCLOSURE**

Figure 3-3

NOTE:

- Enclosure to be driven, held stationary or rotating, by means of suitable loose link or floating type connection such as a mechanical driven arm or the conduit connection. This is to avoid putting strain on the assembly due to the run-out and or deflection that may occur during operation. This is to be "play" between the slip ring driven item and the device that is driving it. (See Section 8.0 REPLACEMENT PARTS for optional bolt on drive brackets).

3.1.5 Explosion Proof Enclosures (XRU, XSU, and XSU with optional air pass) Figure: 3-4

3.1.5.1 For all explosion proof enclosures, user must seal incoming and outgoing electrical conduit according to National Electric Code. For XSU models there is a cavity behind the conduit fitting(s) for sealant for the brush leads and the core leads in the enclosure housing and core lead junction box. For XRU models there is a cavity behind the conduit fitting(s) in the entrance ring for the brush leads and threads at the top of the shaft inside the enclosure for the core leads for sealant.

3.1.5.2 Slip Ring is accessed by removal of enclosure cover, side panels, or bolted cover.
XRU = Screwed on cover, loosen the set screw and use a strap wrench to turn the cover counterclockwise. XSU= bolted on side panels and should be torqued to 14 ft-lbs.

3.1.5.3 For XRU explosion proof assembly mounting and wiring instructions, refer to section 3.1.3.3 slip ring in RU style Revolving Enclosure.

3.1.5.4 For XSU explosion proof assembly mounting and wiring instructions, refer to sections 3.1.4.3 and 3.1.4.4 slip ring SU style Swivel Enclosure.

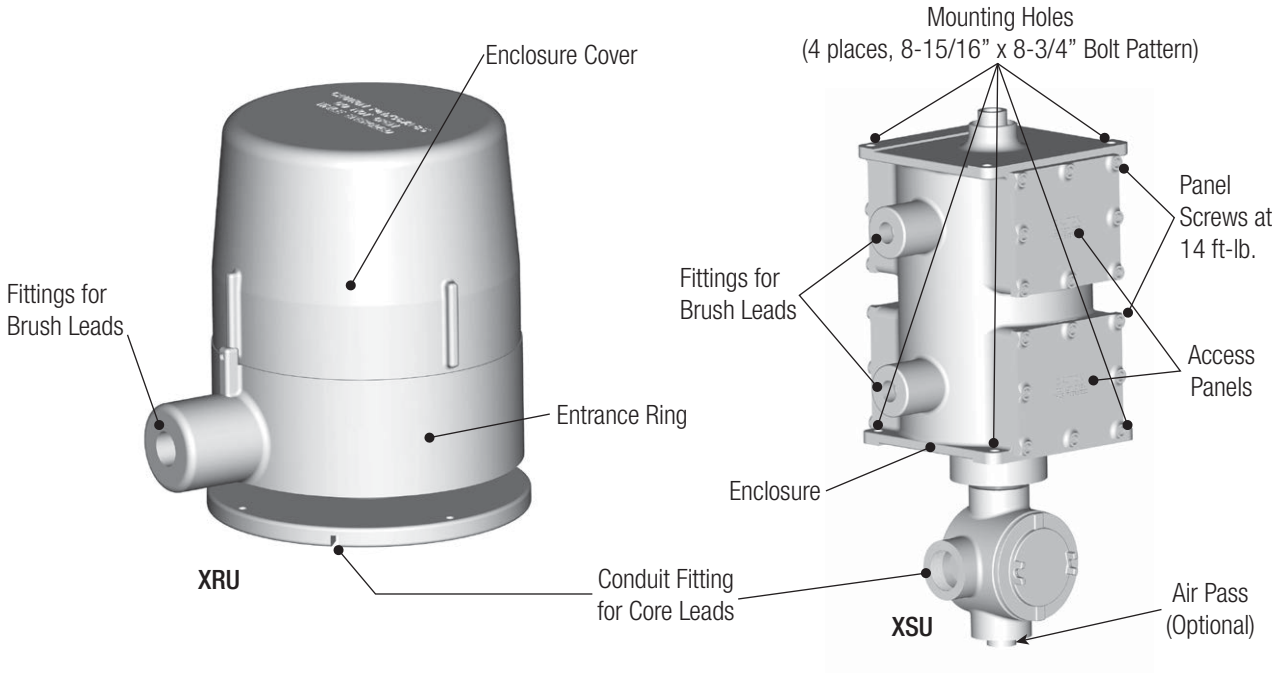


Figure 3-4

NOTE:

- Enclosure to be driven, held stationary or rotating, by means of a suitable loose link or floating type of connection such as a mechanical drive arm or the conduit connection. This is to avoid putting strain on the assembly due to the run-out and or deflection that may occur during operation. This is to be "play" between the slip ring and the device that is driving it.

SECTION 3 - INSTALLATION

3.2 Wiring and Connections

3.2.1 Perform all wiring according to National Electrical Code guidelines and any applicable codes. (Refer to NEC tables: 310.15(B)(16), 310.15(B)(17), 310.15(B)(18), 310.15(B)(19).

3.2.2 We recommend using flexible stranded wire for brush and core lead terminations. All wire sizes and types must be appropriate to the required amperage and voltage. **(See 3.2.1 for NEC Tables)**

3.2.3 When making electrical connections at lugs on the brush holders and at the ends of core lead wires, busbars or terminal block should be used. Core leads may be cut to desired length at time of installation. Be sure electrical connections to the brush holders do not interfere or exert tension on the brush holders and/or the carriage assembly.

3.2.4 Connectors in the optional core lead terminal blocks require 5/16" of stripped insulation.

3.2.5 The optional core lead terminal block provides connections to the rings. Use the appropriate crimp connectors if the terminal block is not supplied.

3.2.6 Screws used in the electrical connections must be tightened to achieve the designated electrical rating.

3.2.7 Brush lead connections are numbered to correspond to core lead connections. The lock washer used on brush lead terminals should NOT be placed between the brush shunt(s) and the brush lead. It may be placed above or below the group as needed. **See Figure: 3-5**

3.2.8 For wiring the optional heater with thermostat: from the power source, connect one lead to the power and the other lead to the neutral or negative. If 3 phase power is used, the heater wire will be hooked up to only one phase and neutral/ground. Make sure the power source matches the voltage rating on the thermostat.

NOTE:

- If the thermostat is supplied separate from the heater, the thermostat is to be wired in series with the power lead.

⚠ WARNING

- **During installation of the slip ring, proper air gap must be maintained between conductive items, and all terminal connections. Refer to U.L. 508C standards.**

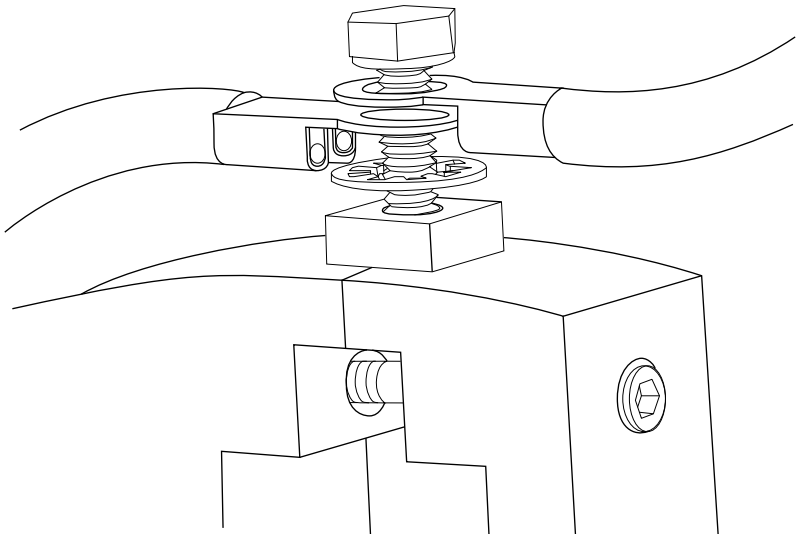


Figure 3-5

SECTION 4 - MAINTENANCE

4.0 Lubrication

4.0.1 All bearings are lubricated for life at the factory. Additional lubrication should not be required.

⚠ CAUTION

- **Do not apply any lubrication or solvent cleaning agents to any part of the slip ring. Use only dry air to clean slip ring assembly.**

4.1 Inspections

⚠ CAUTION

- Before performing inspections and maintenance procedures, ensure all power is disconnected and all safety procedures (lock-out / tag-out) are followed.

4.1.2 Make the first inspection shortly after installation and/or operation to ensure all electrical connections are tight and all mechanical items are properly adjusted. Make continuing preventative inspections on a regular basis after every 200-400 hours of operation under normal conditions. The need for periodic preventative maintenance inspections can be tailored and/or varied depending on the application requirements.

4.2 Brush Holders

4.2.1 Inspect brush holders for proper alignment. Locate brush holders so that the entire brush contact surface rides squarely on the ring with the brush moving freely in the brush holder. Position brush holders so the brush makes contact with the middle of the conductor and is not offset. **See Figure: 4-3**

4.2.2 Check brush holder clamps for tightness. Set clamp bolt at 10 in-lb. max.

4.2.3. Inspect brush terminations at the holder to assure that no external force is imposed on the holder. We recommend flexible or soft wire leads for these terminations. Use external clamps to support the entire weight of the leads.

4.3 Brushes

4.3.1 Inspect for wear.

a. Style with the spring on the top of the brush **See Figure: 4-1**: If the distance from the top of the insulator to the lower part of the brush spring is 093" or less, replace the brush.

b. On the metal type DF holder assembly with dual brushes **See Figure 4-2:** If the wide portion of the brush is worn to 050" or less, replace the brush holder assembly.

4.3.2 Inspect brush contact surface by removing the brush if required. Remove surface dirt, oxidation, pitting, or other contaminants by using a brass or poly brush or 320 grit sand paper. Slip ring cleaning kit available (see 8.0 REPLACEMENT PARTS, for optional slip ring cleaning kit). Care is to be taken not to load-up the brush surface with dust or contaminants.

4.3.3 To remove and replace brush on square post mounting brush holder **See Figure: 4-1:**

1. Remove the brush shunt lead and brush lead wiring from top of brush holder by removing top terminal screw.
2. Lift spring slightly with a hook type tool.
3. Tilt brush out from under the spring and away from holder for removal.
4. To reassemble, replace the brush in the reverse fashion.

4.3.4 To remove and replace brush holder assembly on square post **See Figure: 4-1**:

1. Remove brush per **Section 4.3.3.**
2. Remove allen screw located on side of holder between top terminal screw and spring.
3. Remove holder assembly from post.
4. To reassemble, replace the assembly in the reverse fashion. Set clamp bolt at 10 in-lb. max.

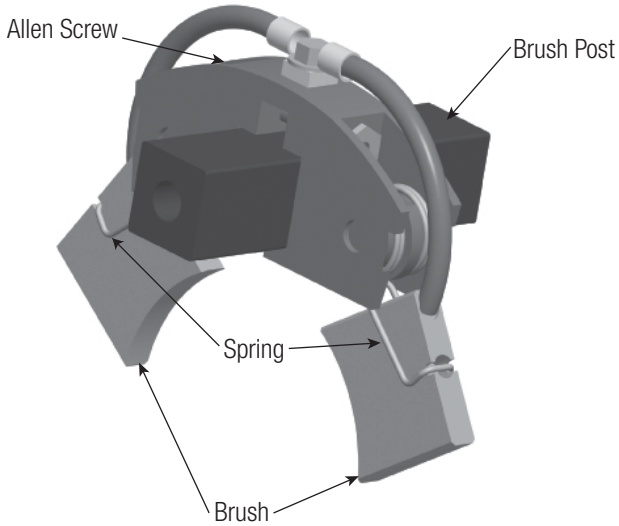


Figure: 4-1

4.3.5 To remove and replace metal type DF style brush holder assembly on fiberglass brush post **See Figure: 4-2**:

1. Remove the brush shunt leads and brush lead wiring from top of brush holder by removing cable connection bolts and or lugs.
2. Remove top brush holder clamp.
3. Slide the remaining brush assembly frame out from under the brush post.
4. To reassemble, replace assembly in the reverse fashion. Torque clamp bolts to 96 in lbs.

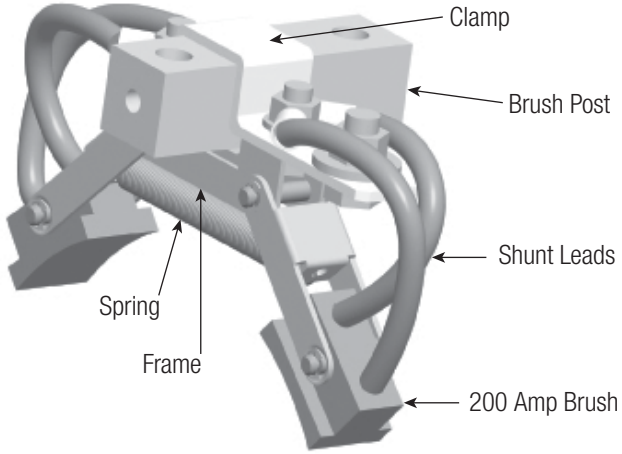


Figure: 4-2

SECTION 4 - MAINTENANCE

4.4 Brush Fit Inspection

4.4.1 The brush spring cross-bar must be seated in the brush slot. **See Figure: 4-3**

NOTE:

- Brushes must run at 90° ± 3° square on the rings. If the brush is not square, adjust position of brush holder on brush post.
- Brushes do not need to run on the center of the rings, but there should be no forceful friction against the insulators.

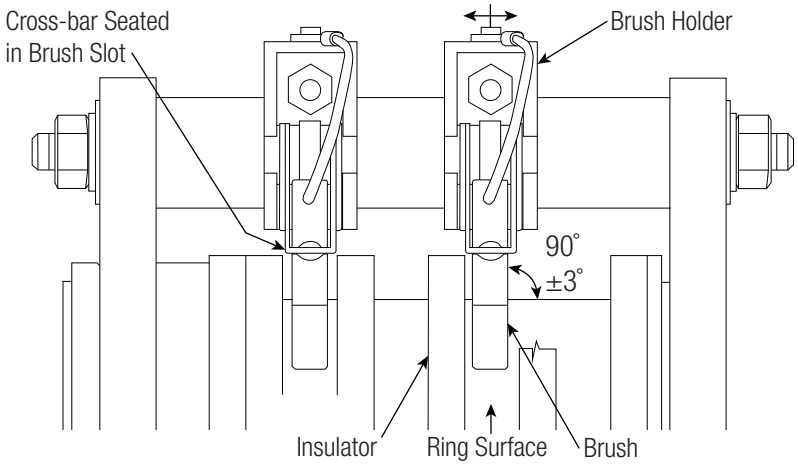
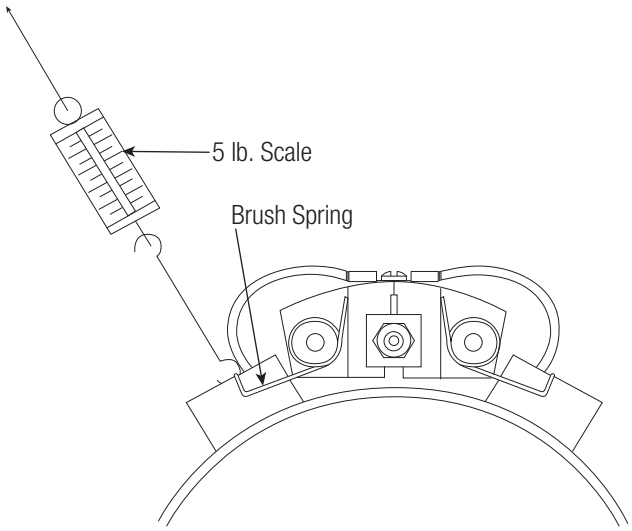


Figure: 4-3

4.5 Brush Springs

4.5.1 Inspect and test brush springs to assure uniform brush pressure. If brush springs fall below the recommended pressure, replace entire brush holder.



Brush	Spring
15	1.0 lb. minimum
35	1.5 lbs. minimum
70	3.0 lbs. minimum
200	2.5 lbs. minimum

Figure: 4-4

NOTE:

- If bush posts are mounted separate from slip ring assembly, follow manufacturer's recommendation on mounting distance from rings.

SECTION 4 - MAINTENANCE

4.6 Rings

4.6.1 Inspect the ring surface for dirt, oxidation, or other contaminant's. A properly operating ring will have a film that appears burnished in color with a darker surrounding color where the brushes track. If the ring requires cleaning, order Slip Ring Polishing Kit Part No. XA-41286. **Refer to Section 4.10 Cleaning**

4.7 Electrical Connections

4.7.1 Inspect all electrical connections for corrosion and tightness. Loose and/or corroded terminations will cause a concentration of excessive heat.

4.8 Brush Rigging

4.8.1 Brush posts are supported between two outboard bearings. The brush posts extend to the outboard bearings and are secured by a notch in the outboard bearing. The notch prevents rotation of the brush post.

4.8.2 Spacing between the outboard bearings is critical to ensure the free rotation of the brush carriage rigging. The brush posts are cut to an exact length in order to provide the proper spacing.

a. For 1.5" bore slip rings, locate the outboard bearings against the insulator and have a 0.20" clearance without deformation of the material.

b. For 2.5" bore and larger without ball bearings, end play tolerance between the core insulators and both sides of the Out Board Bearing must NOT be less than .030" and no more than .090".

⚠ CAUTION

- **End play should be checked in every slip ring assembly with the appropriate feeler gauge, dependent on the bore size of the ring. Failure to do so can result in damage to the Out Board Bearings (OBB) or brush posts.**
- **Do not overtighten the outboard brush post nuts. Torque 0.75" brush posts to 25-30 in-lbs. Make a final check to ensure there is no binding of the outboard brush rigging or binding of the brushes with insulator barriers.**

4.9 Enclosure Inspection

4.9.1 Moisture is the major cause of slip ring deterioration. Water will corrode parts and breakdown insulation. Dust and dirt present within the enclosure will affect the proper operation of the assembly. Most dusts cause excessive brush and slip ring wear, and conductive dust, if allowed to accumulate will form a path for short circuiting.

4.9.2 A properly designed NEMA 4 enclosure will be dust tight and watertight. However, NEMA 4 enclosures do not eliminate internal condensation. Condensation can be eliminated with the addition of a breather, drain and a thermostatically controlled heater. Consult factory for details.

4.9.3 Periodically perform an inspection by removing the enclosure and checking for condensation, water and dust collection. If contaminant's are found, wipe the enclosure and the assembly with a lint free cloth. If the problem persists, take steps to remedy the leakage or condensation problem.

4.10 Cleaning

4.10.1 In addition to using the slip ring polishing kit No. XA-41286 clean the slip ring using only clean, dry, low pressure air or a vacuum cleaner to remove the contaminants from the rings. Do not use any solvents, aerosol sprays, or liquid cleaners on the slip ring assembly.

SECTION 5 - STORAGE

5.0 When storing the slip ring, keep it at room temperature in a clean, dry, protective place. Place self-contained or bagged absorbent material (desiccant) in the collector ring enclosure during extended periods of storage. Remove absorbent material before putting collector ring into operation.

SECTION 6 - SERIAL NUMBER RECORD

6.0 Make the following information available when ordering replacement parts or discussing the slip ring with the factory by recording the information in the spaces provided here. This information is located on your packing slip, factory invoice, and serial number tag.

Catalog Number of Slip Ring: _____

Serial Number: _____

Date of Purchase: _____

SECTION 7 - TROUBLESHOOTING

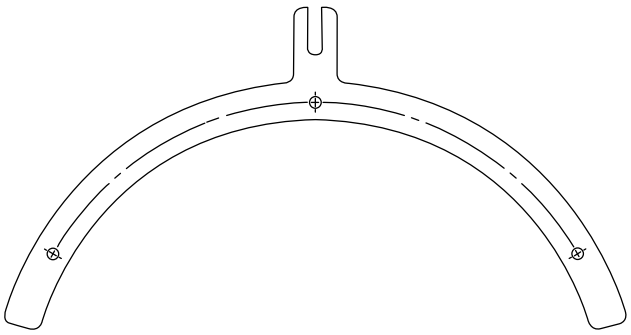
7.0 Some possible problems are addressed in the table here, otherwise, contact the factory at the numbers provided on the back page.

Problem	What to Check
Intermittent Signal or Loss of Signal.	Verify brush wear per Section 4.3.1
	Check spring pressure per Section 4.5
	Check contact surfaces for cleanness. (Ring Polishing Kit No. XA-41286)
	Visually check for spring fit and function. Adjust or replace as necessary.
	consider silver graphite brushes and/or silver plated rings for sensitive data signals and very low amp/volt signals.

SECTION 8 - REPLACEMENT PARTS

NOTE:

- DRIVE ARM BRACKET FOR LOOSE LINK OR FLOATING TYPE DRIVE CONNECTION RU/SU STYLE ENCLOSURE. Consult factory for pricing (part number and/or serial number required for verification of fit).



Flange Enclosure			
No. of Studs	O.D. Inches	Part No.	Bore Size
8	10.25	XA-531705	1.5”
8	17.0	XA-531449	2.5”
8	20.0	XA-531114	2.5”, 3.0”
6	17	XA-532201	2.5”, 3.0”

Figure 8-1

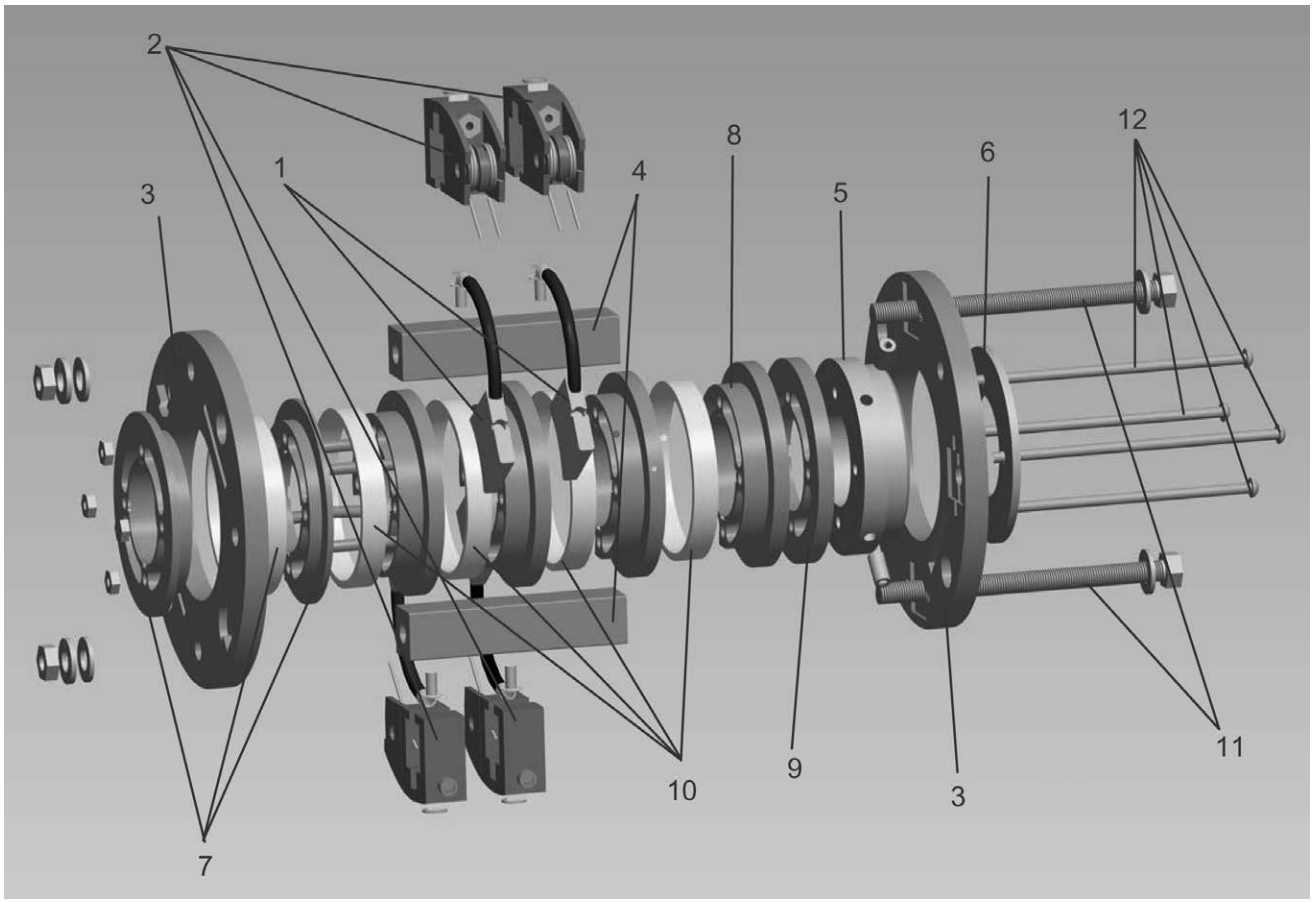


Figure 8-2 Spare Parts overview (1.5” Bore Ring show, other bore size parts may differ slightly. Contact factory for questions).

NOTE:

- Always have Part and or Serial Number when ordering

SECTION 8 - REPLACEMENT PARTS

Item #1 Brushes

Amperage	Slip Ring Bore Sizes			
	1.5"	2.5", 3.0", 3.5"	4.0", 4.5", 5.0", 6.0", 6.5"	8.0", 10.0", 10.5"
6.5" Amp Signal Circuits	XA-30067A	XA-30067B	XA-30067C	XA-30067D
15 Amp	XA-30066A	XA-30066B	XA-30066C	XA-30066D
35 Amp	XA-30068A	XA-30068B	XA-30068C	XA-30068D
75 Amp	XA-30069A	XA-30069B	XA-30069C	XA-30069D
110 Amp	XA-02840	XA-02845	XA-02850	XA-02855
150 Amp	XA-02841	XA-02846	XA-02851	XA-02856
200 Amp	N/A	XA-DRA3-20A-2500	XA-DRA3-20A-4000	XA-DRA3-20A-8000
225 Amp	N/A	XA-02847	XA-02852	XA-02857
300 Amp	N/A	XA-02848	XA-02853	XA-02858
400 Amp	N/A	XA-DRA3-20A-2500(x2)	XA-DRA3-20A-4000(x2)	XA-DRA3-20A-8000(x2)
600 Amp	N/A	XA-DRA3-20A-2500(x3)	XA-DRA3-20A-4000(x3)	XA-DRA3-20A-8000(x3)

Item #2 Brush Holders

Amperage	Single	Double
6.5 Amp & 15 Amp	XA-02800-P	XA-02807-P
35 Amp	XA-02801-P	XA-02808-P
75 Amp	XA-02802-P	XA-02809-P
110 Amp	XA-02803	XA-02810
150 Amp	XA-02804	XA-02811
225 Amp	XA-02805	XA-02805(x2)
300 Amp	XA-02806	XA-02806 (1) / XA-530768 (1)
200 Amp	Brushes and holders are sold as a single unit in these amp ranges.	
400 Amp		
600 Amp		

	Item #3	Item #4	Item #5	Item #6	Item #7
Bore Diameter	Out Board Bearing (C/F)	Brush Post Material	Drive Collars	Retaining Ring	Bearing Ring with insulator (C/F)
1.5"	XA-30061	XA-100505 ✱ To be cut to length at time of assembly	XA-30121	XA-30015Z	XA-41188
2.5"	XA-30079Z		XA-R60A-K	N/A	XA-100200
3.0"	XA-30079Z		XA-R60A3-DK	N/A	XA-100203
3.5"	XA-30079Z		XA-R60A3.5-DK	N/A	XA-R498/R392-8A-35
4.0"	XA-30073		XA-R515-DTK	N/A	XA-R559/R469-8A
4.5"	XA-30073		XA-R515-DTK-4.5	N/A	XA-R559/R469-8A-45
5.0"	XA-30073		XA-R515-DTK-5.0	N/A	XA-R559/R469-8A-50
6.0"	XA-30073		XA-R515-DTK-6	N/A	XA-R559/R469-8A-6
8.0"	XA-30076		XA-R1345	N/A	XA-100210
10.0"	XA-30076		XA-R1345-10000M	N/A	XA-100186
Special bore sizes: Consult Factory			C/F = Consult factory if assembly is equipped with ball bearings, wrap around cover, or other special features.		

SECTION 8 - REPLACEMENT PARTS

ITEM #8 *(see also SPACERS for circuits rated 110 Amps and above)					
Amps/Voltage	Slip Ring Bore Size				
	1.5”	2.5”	3.0”	3.5”	4.0”
6.5A/250V Silver	XA-R983	XA-R392-B-2500	XA-R392-B-3000	XA-R392-B-3500	XA-R469-B-4000
15A/250V	XA-R983	XA-R392-B-2500	XA-R392-B-3000	XA-R-392-B-3500	XA-R469-B-4000
35A/250V	XA-R27-4D	XA-R392-4A	XA-R392-4A-3000-M	XA-R392-4A-3500	XA-R469-4A
35A/600V	XA-R27-4E	XA-R392-4A	XA-R392-4A-3000-M	XA-R392-4A-3500	XA-R469-4A
75A/600V	XA-R27-8C	XA-R392-8A	XA-R392-8A-3000-M	XA-R392-8A-3500	XA-R469-8A
110A/600V	XA-R27-4E	XA-R392-4A	XA-R392-4A-3000-M	XA-R392-4A-3500	XA-R469-4A
150A/600V	N/A	XA-R392-8A	XA-R392-8A-3000-M	XA-R392-8A-3500	XA-R469-4A
200A/600V	N/A	XA-R392-8A	XA-R392-8A-3000-M	XA-R392-8A-3500	XA-R469-8A
225A/600V	N/A	XA-R392-8A	XA-R392-8A-3000-M	XA-R392-8A-3500	XA-R469-8A
300A/600V	N/A	XA-R392-8A	XA-R392-8A-3000-M	XA-R392-8A-3500	XA-R469-8A
400A/600V	N/A	XA-R392-8A	XA-R392-8A-3000-M	XA-R392-8A-3500	XA-R469-8A
600A/600V	N/A	XA-R392-8A	XA-R392-8A-3000-M	XA-R392-8A-3500	XA-R469-8A
	Slip Ring Bore Size				
	4.5”	5.0”	6.0”	8.0”	10.0”
6.5A/250V Silver	XA-R469-B-4.5	XA-R469-B-5000	XA-R469-B-6000	XA-R1191-4	XA-R1191-4-10000
15A/250V	XA-R469-B-4.5	XA-R469-B-5000	XA-R469-B-6000	XA-R1191-4	XA-R1191-4-10000
35A/250V	XA-R469-4A-4.5	XA-R469-4A-5000	XA-R469-4A-6000	XA-R1191-4	XA-R1191-4-10000
35A/600V	XA-R469-4A-4.5	XA-R469-4A-5000	XA-R449-4A-6000	XA-R1191-4	XA-R1191-4-10000
75A/600V	XA-R469-8A-4.5	XA-R469-8A-5000	XA-R469-8A-6000	XA-R1191-8	XA-R1191-8-10000
110A/600V	XA-R469-4A-4.5	XA-R469-4A-5000	XA-R469-4A-6000	XA-R1191-4	XA-R1191-4-10000
150A/600V	XA-R469-4A-4.5	XA-R469-4A-5000	XA-R469-4A-6000	XA-R1191-8	XA-R1191-8-10000
200A/600V	XA-R469-8A-4.5	XA-R469-8A-5000	XA-R469-8A-6000	XA-R1191-8	XA-R1191-8-10000
225A/600V	XA-R469-8A-4.5	XA-R469-8A-5000	XA-R469-8A-6000	XA-R1191-8	XA-R1191-8-10000
300A/600V	XA-R469-8A-4.5	XA-R469-8A-5000	XA-R469-8A-6000	XA-R1191-8	XA-R1191-8-10000
400A/600V	XA-R469-8A-4.5	XA-R469-8A-5000	XA-R469-8A-6000	XA-R1191-8	XA-R1191-8-10000
600A/600V	XA-R469-8A-4.5	XA-R469-8A-5000	XA-R469-8A-6000	XA-R1191-8	XA-R1191-8-10000

SECTION 8 - REPLACEMENT PARTS

Spacers (not shown in exploded diagram)

Amps/Voltage	Slip Ring Bore Size				
	1.5”	2.5”	3.0”	3.5”	4.0”
6.5A/250V Silver	✱ Spacers are required in conjunction with insulators (Item #8) on conductors rated 110 Amps and above.				
15A/250V					
35A/250V					
35A/600V					
75A/600V					
110A/600V	XA-R27-8M	XA-R392-8M	XA-R392-8M-3000-M	XA-R392-8M-3500	XA-R469-8M
150A/600V	XA-R27-8M	XA-R392-8M	XA-R392-8M-3000-M	XA-R392-8M-3500	XA-R469-8M
200A/600V	N/A	XA-R392-8M	XA-R392-8M-3000-M	XA-R392-8M-3500	XA-R469-8M
225A/600V	N/A	XA-R392-8M	XA-R392-8M-3000-M	XA-R392-8M-3500	XA-R469-8M
300A/600V	N/A	XA-R392-8M	XA-R392-8M-3000-M	XA-R392-8M-3500	XA-R469-8M
400A/600V	N/A	XA-R392-8M	XA-R392-8M-3000-M	XA-R392-8M-3500	XA-R469-8M
600A/600V	N/A	XA-R392-8M	XA-R392-8M-3000-M	XA-R392-8M-3500	XA-R469-8M
	Slip Ring Bore Size				
	4.5”	5.0”	6.0”	8.0”	10.0”
15A/250V Silver	✱ Spacers are required in conjunction with insulators (Item #8) on conductors rated 110 Amps and above.				
15A/250V					
35A/250V					
35A/600V					
75A/600V					
110A/600V	XA-R469-8M-4500	XA-R469-8M-5000	XA-R469-8M-6000	XA-R1191-8M	XA-R1191-8M-10000
150A/600V	XA-R469-8M-4500	XA-R469-8M-5000	XA-R469-8M-6000	XA-R1191-8M	XA-R1191-8M-10000
200A/600V	XA-R469-8M-4500	XA-R469-8M-5000	XA-R469-8M-6000	XA-R1191-8M	XA-R1191-8M-10000
225A/600V	XA-R469-8M-4500	XA-R469-8M-5000	XA-R469-8M-6000	XA-R1191-8M	XA-R1191-8M-10000
300A/600V	XA-R469-8M-4500	XA-R469-8M-5000	XA-R469-8M-6000	XA-R1191-8M	XA-R1191-8M-10000
400A/600V	XA-R469-8M-4500	XA-R469-8M-5000	XA-R469-8M-6000	XA-R1191-8M	XA-R1191-8M-10000
600A/600V	XA-R469-8M-4500	XA-R469-8M-5000	XA-R469-8M-6000	XA-R1191-8M	XA-R1191-8M-10000

SECTION 8 - REPLACEMENT PARTS

Item #9 Barrier

Only 1.5” bore slip rings have barriers next to the outboard bearings

Barrier Part Number: XA-R27-B

Item #10 Z-Ring

Consult Factory for individual replacement rings

Item #11 Brush Post Bolts

Consult Factory for replacement brush holder bolts

Item #12 Core Bolts

Consult Factory for replacement core bolts

NOTES

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