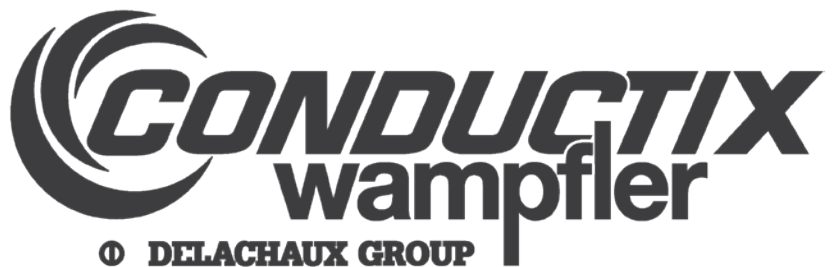
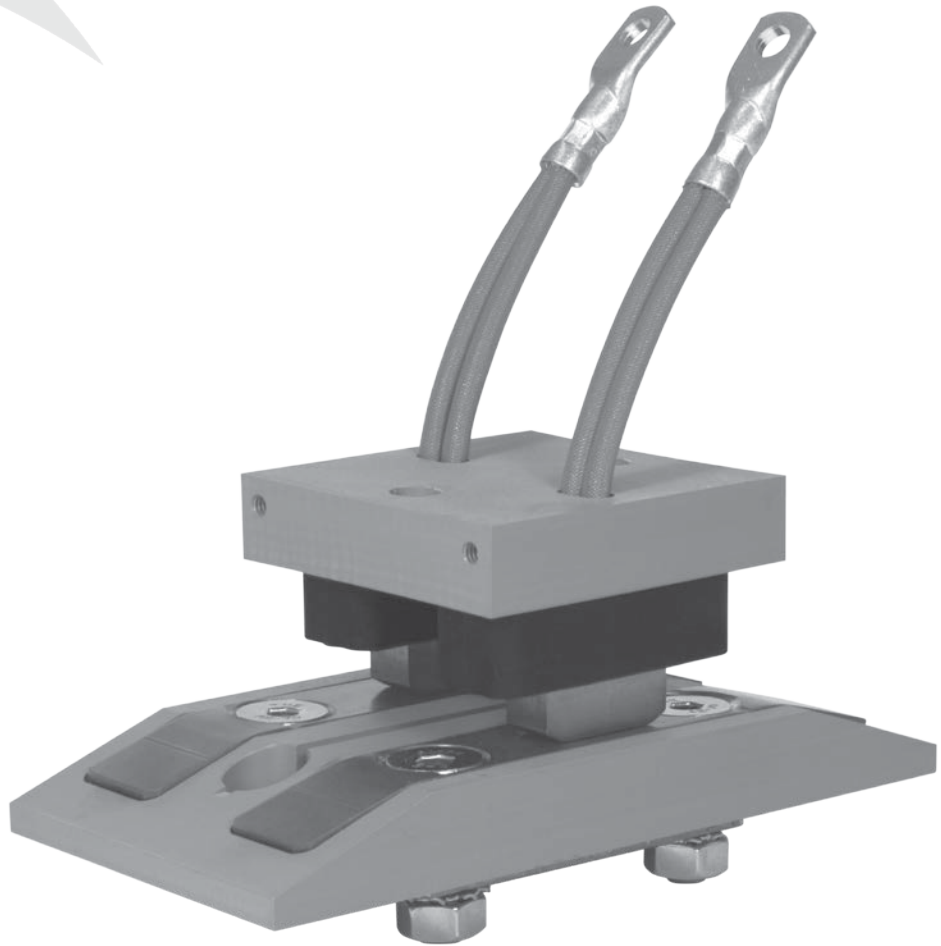


Charging Contacts Manual



CONDUCTIX INCORPORATED

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Seller agrees to repair or exchange the goods sold hereunder necessitated by reason of defective workmanship and material discovered and reported to Seller within one year after shipment of such goods to Buyer.

Except where the nature of the defect is such that it is appropriate, in Seller's judgment, to effect repairs on site, Seller's obligation hereunder to remedy defects shall be limited to repairing or replacing (at Seller's option) FOB point of original shipment by Seller, any part returned to Seller at the risk and cost of Buyer. Defective parts replaced by Seller shall become the property of Seller.

Seller shall only be obligated to make such repair or replacement if the goods have been used by Buyer only in service recommended by Seller and altered only as authorized by Seller. Seller is not responsible for defects which arise from improper installation, neglect, or improper use or from normal wear and tear.

Additionally, Seller's obligation shall be limited by the manufacturer's warranty (and is not further warranted by Seller) for all parts procured from others according to published data, specifications or performance information not designed by or for Seller.

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There is no guarantee or warranty as to anything made or sold by Seller, or any services performed, except as to title and freedom from encumbrances and, except as herein expressly stated and particularly, and without limiting the foregoing, **there is no guarantee or warranty, express or implied, of merchantability or of fitness for any particular purpose or against claim of infringement or the like.**

Seller makes no warranty (and assumes no liability) as to function of equipment or operation of systems built to Buyer's design or of the ability of any goods to interface, operate or function with any portions of Buyer's system not provided by Seller.

Seller's liability on any claim, whether in contract, tort (including negligence), or otherwise, for any loss or damage arising out of, connected with, or resulting from the manufacture, sale, delivery, resale, repair, replacement or use of any products or services shall in no case exceed the price paid for the product or services or any part thereof which give rise to the claim. In no event shall Seller be liable for consequential, special, incidental or other damages, nor shall Seller be liable in respect of personal injury or damage to property not the subject matter hereof unless attributable to gross misconduct of Seller, which shall mean an act or omission by Seller demonstrating reckless disregard of the foreseeable consequences thereof.

Seller is not responsible for incorrect choice of models or where products are used in excess of their rated and recommended capacities and design functions or under abnormal conditions. Seller assumes no liability for loss of time, damage or injuries to property or persons resulting from the use of Seller's products. Buyer shall hold Seller harmless from all liability, claims, suits and expenses in connection with loss or damage resulting from operation of products or utilization of services, respectively, of Seller and shall defend any suit or action which might arise there from in Buyer's name - provided that Seller shall have the right to elect to defend any such suit or action for the account of Buyer. The foregoing shall be the exclusive remedies of the Buyer and all persons and entities claiming through the Buyer.

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SECTION 1 - SAFETY

ATTENTION

- Read this entire booklet prior to attempting any installation and/or maintenance of this product.

Electrical Warnings

Install the charging contact system in accordance with the National Electric Code (NEC) or local codes and/or ordinances applicable in your region.

DANGER

- Hazard of electrical shock or burn. Always disconnect the power before attempting to perform any service function. Follow lock out/tag-out procedures as outlined in OSHA section 1910.147 where appropriate.

Do not use charging contacts with electrical loads greater than the rated current and voltage. Information regarding the current and voltage rating of each contact is recorded on the component type label. Further details can be found in the product catalog.

Operational Warnings

Means of final installation and integrations of this equipment is the responsibility of the OEM integrator.

Modification of this equipment may cause excessive wear or failure and will void the warranty.

Modification may cause safety and fire hazards, the end user takes sole responsibility for any modifications made to the product and in doing so absolves Conductix-Wampfler from any liability.

Maintenance Warnings

Exercise care while installing, servicing, adjusting, and operating the charging contacts and charging system.

Periodically check all fasteners and hardware to ensure they are properly tightened. Reference the drawing provided with the product for fastener torque specifications.

If you have any questions concerning the use or installation of your product, contact the factory:

- North & South America: +1 (800) 521-4888
- Europe & Asia: +49 7621 6620

Specifications and Listings

The charging contact products are built to comply with UL and IEC specifications and standards, but are not generally certified or listed by an independent body.

Some charging contact products may be CE listed, please consult the factory for additional details.

Temperature, Voltage, and Ampere Ratings

The charging contact products are rated to withstand a maximum operating temperature of 100°C (212°F) and minimum operating temperature of -20°C (-4°F).

The current and voltage rating of each contact is recorded on the component type label. Further details can be found in the product catalog.

Charging contacts can be supplied with a large variety of connections, voltage ratings, and ampere ratings. Consult the factory for additional details.

Product Markings

Each base plate and vehicle collector is marked with a type label containing the Conductix name and logo, the product catalog number, and the voltage and ampere rating for the product.

SECTION 2 - INSTALLATION

Handling

Never support the unit by brush leads or connecting cables. Always carry the unit by supporting the plastic base plate or collector plate.

Application Types

Common applications include, but are not limited to, battery or capacitor charging in the following equipment: automatic guided vehicles (AGVs), pallet shuttle systems, and material handling systems.

Charging contact assemblies can be purchased as a complete set, base and collector, or as individual components. See **Figure 5-1** for additional details.

NOTE

- Enclosures are not provided with charging contact assemblies. The OEM integrator must provide an appropriate enclosure to meet applicable safety standards in their region.

General Assembly Instructions

1. Torque all fasteners to the specified value(s) indicated on the drawing provided with the product.

NOTE

- Due to the large variety of possible mounting configurations, fasteners for mounting the collector and base plate are not provided with the product. Reference the provided drawing for fastener clearance hole sizes.

Mounting

1. Mount the collector assembly using the provided clearance holes for socket head cap screws. See **Figure 5-2**.
2. The collector assembly should be supported around the clearance hole location, out to a minimum diameter of 2 times the clearance hole diameter. See **Figure 5-3**.

NOTE

- Care must be taken to ensure the brush lead wires are not damaged during the installation process, and have sufficient room to allow for movement of the brush pack. Brush pack movement is limited to the 5.5mm (0.22in). See **Figure 5-2**.

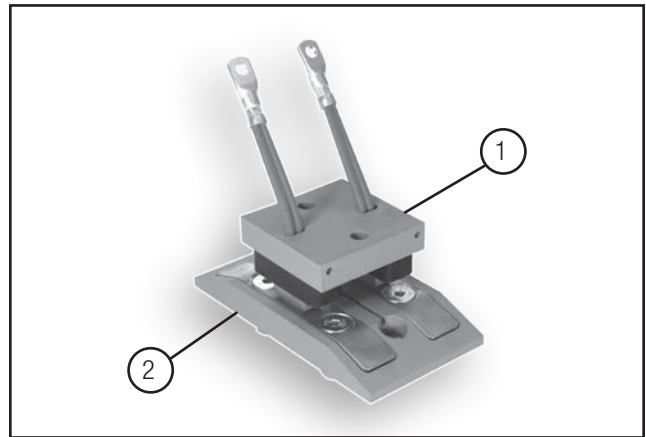


Figure 5-1 Charging Contact Assembly Components, Collector, and Base Plate

1. Collector Assembly
2. Base Plate Assembly

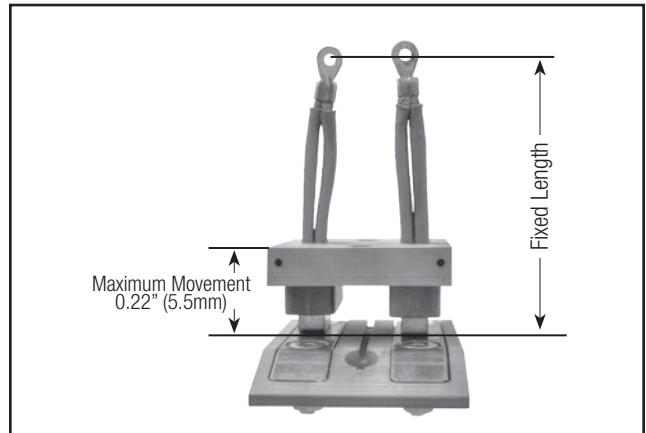


Figure 5-2 Allowable Brush Pack Movement

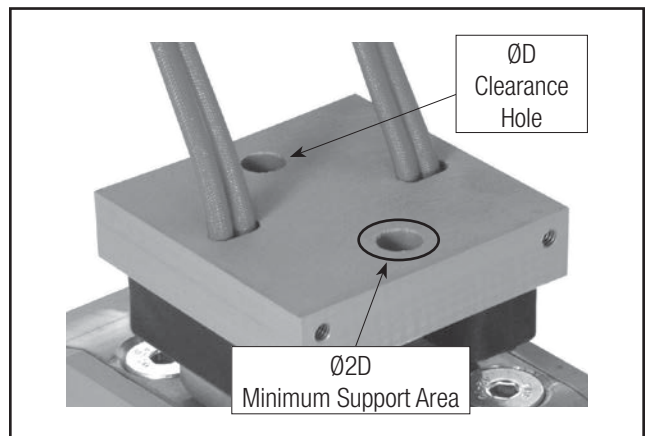


Figure 5-3 Top of Collector Showing Mounting Hole and Minimum Support Area

SECTION 2 - INSTALLATION

NOTE

- Provisions for making the electrical connections are provided on the collector assemblies. Reference the provided drawing for brush lead lug size.
- Care must be taken when connecting the brush leads to ensure the correct phases are clustered together. Any fault condition resulting from improper installation is the responsibility of the user.

1. Mount the base plate assembly using the provided clearance holes for socket head cap screws. See **Figure 6-1**.
2. The base plate assembly should be supported around the clearance hole location, out to a minimum diameter of 2 times the clearance hole diameter, and along the outer 3.0mm (0.12in) minimum perimeter of the plate.

NOTE

- Provisions for making the electrical connections are provided on the bottom of the base plate assembly.
- Care must be taken when connecting the cable lugs to ensure the correct phases are clustered together. Reference the provided drawing for cable lug size. Any fault condition resulting from improper installation is the responsibility of the user.

3. The base plate must be mounted in a suitable enclosure for the service environment.
4. For 60Vdc (25Vac) service, per IEC 60664-1 (UL 840), pollution degree 3, a minimum clearance and creepage distance of 2.2mm (0.09in) must be maintained between each phase, and phase to ground. See **Figure 6-2**.

NOTE

- This value may vary based on voltage, enclosure type, and regional standards.

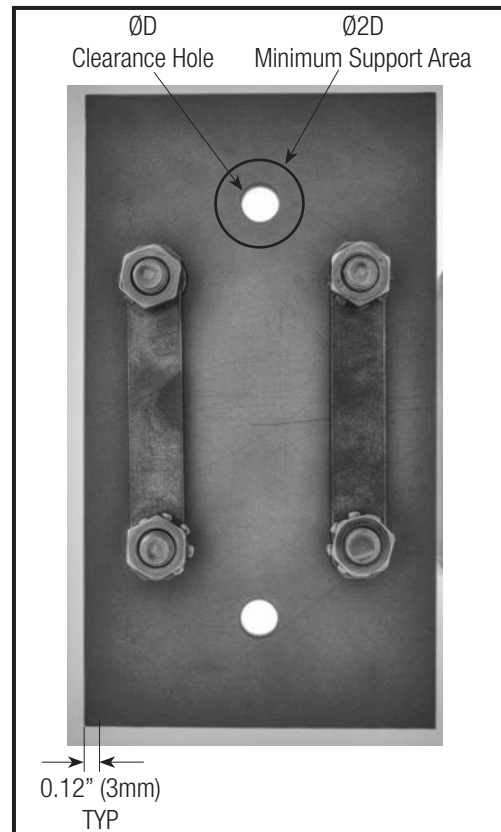


Figure 6-1 Bottom of Base Plate Showing Mounting Holes and Minimum Support Area.

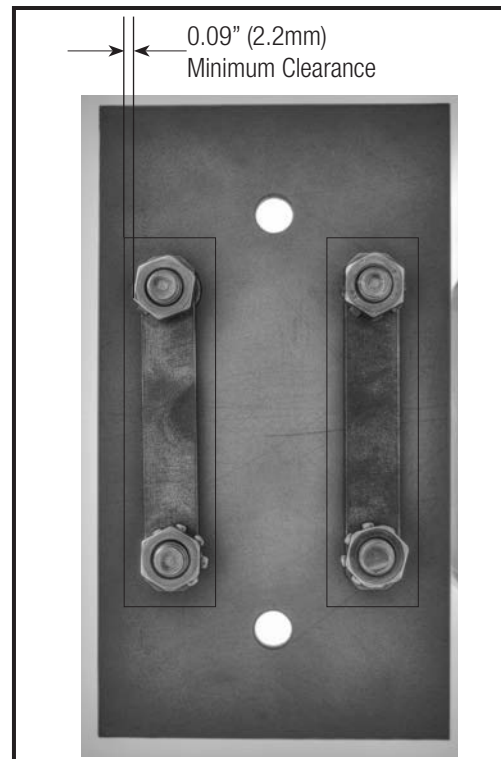


Figure 6-2 Bottom of Base Plate Showing Minimum Clearance

SECTION 2 - INSTALLATION

Concrete Floor Mounting

Some configurations may require a floor installation.

1. Install AGV-Collectors on vehicle in direction of travel.
2. Install AGV-Base Plate on top of the floor.

NOTE

- Reference the supplied drawing to determine the collector's contact dimension.
- Allowable Tolerance: +/- 2 mm.

3. Seal around the edge of the base plate using an RTV silicone or foam gasket material.
4. Set base plates on top of 1 concrete cutout square. See **Figure 7-1**.

NOTE

- Concrete cutout size will vary on application.
- The base concrete material must have a minimum thickness of 3.0".

5. Use a ruler or scale and permanent marker to draw the layout of the base plates and mounting holes on the concrete cutout square. See **Figure 7-1**.
6. Drill pilot holes for concrete anchors. Conductix-Wampfler recommends steel drop-in type anchors. See **Figure 7-2**.
7. Be sure to drill depth of anchor only and hammer with set tool when anchor is flush with top of concrete. Follow concrete anchor manufacturer's instructions. See **Figure 7-2**.
8. Set steel drop-in anchors (requires a set tool). See **Figure 7-2**.
9. Place bolts in anchors but do not tighten down - this will prevent concrete dust and small pieces from falling in the holes.
10. Cut the concrete perimeter first and then make small cross cuts. To minimize chisel use, use a diamond concrete cutting wheel. See **Figure 7-3**.
11. Use diamond concrete cutting wheel and chisel to remove large pieces of concrete after cutting. See **Figure 7-3**.
12. Clean the surface of the concrete cutout square of any debris.
13. Install cables onto base plates.

NOTE

- Concrete cuts may need to be extended to accommodate cabling.

14. Remove bolts and set base plates on concrete cutout square layout.
15. Replace bolts and tighten to manufacturer's torque specification.
16. If desired, fill the open cuts with an appropriate epoxy.

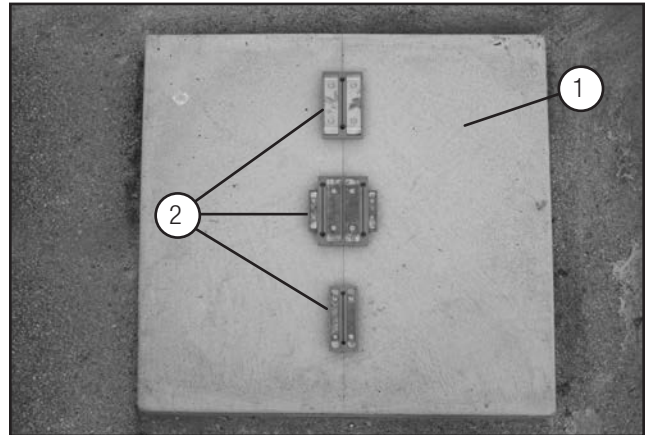


Figure 7-1 1. Concrete Cutout
2. Base Plates

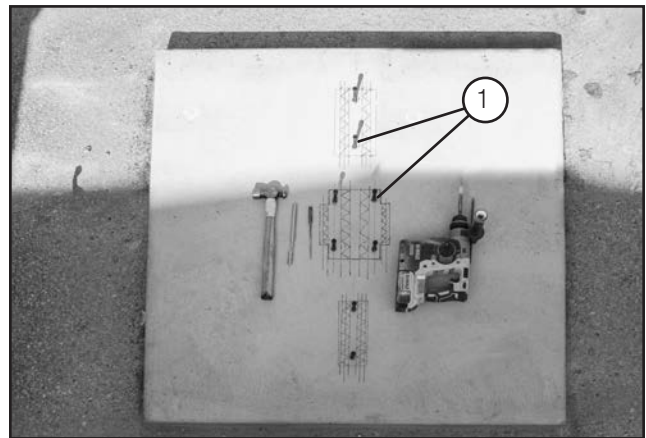


Figure 7-2 1. Mounting Holes

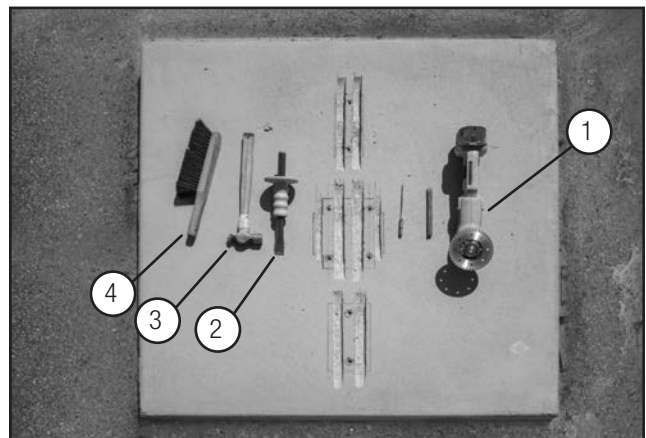


Figure 7-3 Finished Product
1. Diamond Concrete Cutting Wheel
2. Chisel
3. Hammer
4. Brush

SECTION 3 - MAINTENANCE

ATTENTION

- Before performing inspections and/or maintenance procedures, ensure all power is disconnected and all safety procedures are followed.

System Inspections

1. Perform the first inspection after the charging system has cycled 100 times.
2. Ensure that all electrical and mechanical connectors are properly secured, and that the mechanical alignment is within specification. Reference the provided drawing for additional alignment detail.
3. Perform period inspections every 15,000 – 20,000 charging cycles. During these inspections ensure that all electrical and mechanical connectors are properly secured.

Brushes

1. Inspect the electrical brushes on the collector for wear. If the distance from the bottom of the brush holder to the brush surface is less than 7.0mm (0.28in), replace the brush. See **Figure 8-1**.
2. Inspect the brush lead wires to ensure proper function and alignment with the clearance holes in the collector.
3. Inspect the contact surfaces on the base plate for wear.
4. Remove surface dirt, oxidation, pitting, and other contaminants from the contact surfaces via a brass brush or 320 grit sand paper.

ATTENTION

- Do not use solvents or chemicals to clean the contact surfaces and/or brushes.

Brush Springs

1. Inspect and test the brush springs to ensure proper contact pressure.
2. Measure the force required to depress the brush assembly, if contact force falls below the values shown in **Table 8-1**, replace the entire collector assembly.

Electrical Connections

1. Inspect all electrical connections for corrosion.
2. Ensure that all fasteners are properly tightened.

NOTE

- Poor electrical connections can lead to increased electrical resistance and poor charging performance.

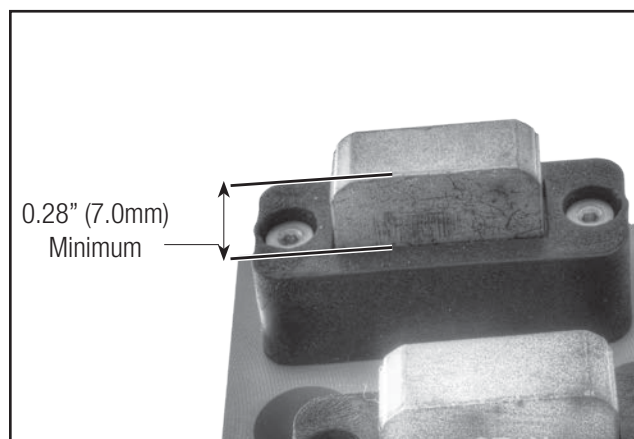


Figure 8-1 Brush Height Measurement

Brush	Minimum Force (N/lbf)
20A	11 N / 2.5 lbf
50A	29 N / 6.5 lbf
75A	37 N / 8.4 lbf

Table 8-1 Minimum Brush Contact Force

SECTION 4 - STORAGE

Packaging

When storing charging contacts or sub assembly components care must be taken to ensure the brush contact face and contact plate are protected from dirt, debris, abrasion, oils, grease, and corrosion.

Plastic bags are recommended to protect the charging contacts or sub assembly components.

Long-Term Storage

Store charging contacts or components in a dry environment to prevent the formation of corrosion or oxidation on the contact surfaces.

Before use, clean the brush and contact surfaces to remove dirt, oxidation, pitting, and other contaminants via a brass brush or 320 grit sand paper.

SECTION 5 - TROUBLESHOOTING

Troubleshooting

Potential issues and solutions are shown below in **Table 10-1**, contact the factory for additional support.

Issue	Potential Cause	Solution
Intermittent charging or loss of charging current	Mechanical alignment	Inspect the contact sets mechanical alignment, reference the supplied drawing for further details
	Electrical connections	Inspect the electrical connections to the base plate and contact brushes
	Brush contact	Inspect the brush pressure, brush, and contact plate
Damage to brush or contact plate	Mechanical alignment	Inspect the contact sets mechanical alignment, reference the supplied drawing for further details

Table 10-1 Troubleshooting Problems, Potential Cause, and Solution

SECTION 6 - REPLACEMENT PARTS

Replacement Parts

Replacement parts are shown below in **Table 11-1** and **Table 11-2**, contact the factory for additional support or a quotation.

ATTENTION

- Only mate base and collectors with matching base or collector.

NOTE

- The parts listed in **Table 11-2** are not an all inclusive list. If you do not see the part number you require in these tables please contact the factory.

Brush Ampere Rating	Part Number
20A	562687
50A	562696
75A	562700

Table 11-1 Replacement Brushes

System Ampere Rating	Collector Part Number	Base Plate Part Number
20A	BCC020A2WO	BCB020A2WO
50A	BCC050A2WO	BCB050A2WO
75A	BCC075A2WO	BCB075A2WO
100A	BCC100A2WO	BCB100A2WO
150A	BCC150A2WO	BCB150A2WO
200A	BCC200A2WO	BCB200A2WO
300A	BCC300A2WO	BCB300A2WO
400A	BCC400A1WO	BCB400A1WO
600A	BCC600A1WO	BCB600A1WO
200A + 20A	BCC200A2WP	BCB200A2WP
300A + 20A	BCC300A2WP	BCB300A2WP
400A + 20A	BCC400A1WP	BCB400A1WP
600A + 20A	BCC600A1WP	BCB600A1WP

Table 11-2 Replacement Collector and Base Plate Assemblies

www.conductix.us

USA / LATIN AMERICA

10102 F Street
Omaha, NE 68127

Customer Support
Phone +1-800-521-4888

Phone +1-402-339-9300
Fax +1-402-339-9627

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Contact us for our Global Sales Offices

