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Instruction Manual

Chargemaster Tetra Charging Bars

IMPORTANT

SIMCO Industrial Static Control recommends that these instructions be read completely before installation or operation of this equipment. Failure to do so could result in personal injury and/or damage to the equipment. Products contained in this manual are covered by one or more of the following U.S. patents: 3,892,614; 4,092,543; 4,188,530; 4,216,518; 4,423,462; 4,529,940; 4,665,462; 4,716,371; 4,734,580; 4,774,472; 4,872,083; 4,860,159; 5,017,876; 5,153,811; 5,008,594; 4,836,044 ; 5,930,105; 6,088,211; US6,259,591 B1 and corresponding foreign patents. U.S. and foreign patents pending.



An Illinois Tool Works Company

2257 North Penn Road • Hatfield, PA 19440
Phone: 215-822-6401 • Fax: 2215-822-3795
e-mail: customerservice @simcomail.com
Web: <http://www.simco.biz>

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Section 1 – Notes and Cautions

NOTE

Statements identified with a **NOTE** indicate precautions necessary to avoid potential equipment failure.

CAUTION

Statements identified with a **CAUTION** indicate potential safety hazards.

NOTE

This equipment must be correctly installed and properly maintained as outlined in this manual.

1. Read instruction manual before installing or operating equipment.
2. Only qualified service personnel are to perform installation

and repairs.

3. All equipment must be properly grounded, including the machine frame to which the equipment is mounted and all metal parts in the vicinity.

CAUTION

Electrical Shock Hazard – Always disconnect power supply before connecting or disconnecting charging equipment. Never touch a charging bar when power supply is energized.

CAUTION

Fire Hazard – Do not install or operate equipment in close proximity to any flammable solvents or flammable materials.

Section 2 – Introduction

SIMCO's Tetra Charging Bars are part of the Chargemaster Electrostatic Generating System. These bars are energized with SIMCO Chargemaster CH Series DC power supplies that provide the necessary high voltage (typically 20-30 kV) that is current limited for safety. This system is used to produce electrostatic adhesion for temporarily bonding or pinning materials. The success of the process depends on the insulating qualities of the material being charged. Good insulators, such as plastic films, work particularly well with this process.

The Tetra charging bar is supplied with mounting clamps that can be adjusted along the length of the bar. The bar can also be rotated +/-30 degrees within the clamps for optimum alignment with the material being charged. The easy to clean design makes routine maintenance simple with the supplied cleaning brush. The Tetra bar is available with a straight cable exit or a right-angled cable exit. The high voltage cable is removable (a quick disconnect feature with stainless steel components is integrated into each bar) and covered by flame resistant, flexible tubing that also provides superior abrasion resistance.

Receipt of equipment

1. Carefully remove the equipment from its carton.
2. Inspect contents for damage that may have occurred during shipment. If any damage has occurred, the local carrier should be notified at once. A report should be forwarded to SIMCO Industrial Static Control, 2257 North Penn Road, Hatfield PA 19440, and (215) 822-6401.
3. Empty the carton to ensure that small parts are not discarded.

Return Shipments

Prior to returning goods, contact a SIMCO Industrial Static Control Customer Service Representative for a Return Authorization Number. This number should be included on the packing list. All correspondence should also reference the Return Authorization Number. Any item being returned should be shipped prepaid and packed to provide adequate protection.

Section 3 – Specifications

	Pinner Tetra Charging Bar
Ionizing Points	Stainless Steel Spaced on 1/2" centers
Operating Voltage	+/-30 kV DC maximum
Operating Distance	1/2" to 4" (1 1/2" nominal) <i>(Application and operating voltage dependent)</i>
Operating Temperature	110 F (44 C) maximum
Max Operating Humidity	70% RH maximum, no dewing permissible
Dimensions	1 5/16" DIA x (EL + 2 5/16") L <i>EL = Effective Length (available 6" to 141" in 6" increments)</i>
Casing Material	Polyvinyl Chloride Rugged, impact resistant, light grey color
Mounting	Mounting clamps with fully adjustable centers Supplied with 3/8-16 nylon bolts and nuts Bar rotation adjustable +/-30 degrees
Weight	1/2 lb (per foot)
High Voltage Cable	Flexible, abrasion-resistant, with flame retardant insulation 10 ft standard length (1/2" min bend radius)
Pin Current	10 μ A per inch EL (16 kV at 1") 30 μ A per inch EL (25 kV at 1")

Section 4 – Installation

E. CAUTION

Fire Hazard – Do not install or operate equipment in close proximity to any flammable solvents or flammable materials.

A. DETERMINE BAR LOCATION

1. **Charging Bar with Grounded Surface** In Figure-1A, the charging bar faces an empty core in a roll-to-roll changeover application. The empty core is mounted on a grounded metal shaft and a plastic film travels between the charging bar and the empty core. The negative ions created by the charging bar are driven toward the grounded metal shaft by an electric field formed between them. The film blocks ion travel through the field and becomes electrostatically charged, resulting in adhesion between the film and roll.

In Figure-1B, the charging bar faces a production fixture that moves beneath the charging bar (alternatively the bar could move over the fixture) in an interleaving application where paper or film is pinned to metal prior to cutting and stacking. After the materials to be pinned together are positioned on the fixture, it moves beneath the charging bar. The negative ions created by the bar are driven toward the grounded metal fixture by an electric field formed between them. The top material blocks ion travel through the field and becomes electrostatically charged, resulting in adhesion between the two materials and the fixture.

2. **Charging Bar with Static Neutralizing Bar** In Figure-2, the

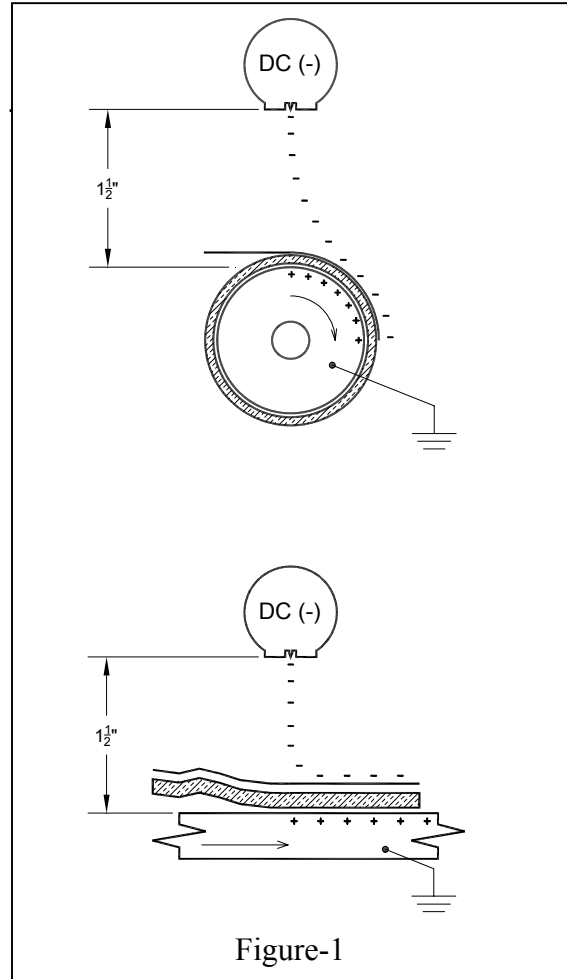


Figure-1

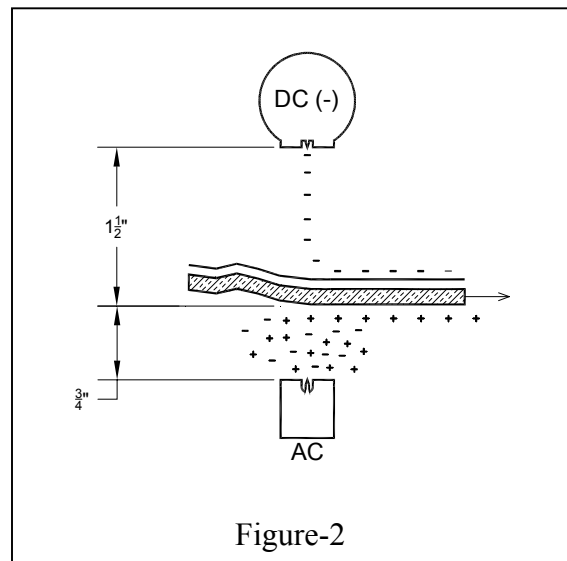


Figure-2

Section 4 – Installation

charging bar faces an insulative film while a static neutralizing bar faces an insulative sheet of material on the opposite side (glass, plastic, light particle board, etc.). As the two materials to be pinned together pass between the bars, the negative ions created by the charging bar charge the film, while the static neutralizing bar attempts to eliminate the apparent charge on the sheet. This deposits a positive charge on the lower sheet. The use of the static neutralizing bar dramatically improves the electrostatic pinning adhesion between the two materials.

3. **Two Charging Bars** In Figure-3, one charging bar faces another of opposite polarity in an application where decorative sheets are pinned to both sides of heavy particleboard prior to laminating. As the materials move between the charging bars, the opposite polarity ions created by each bar are driven toward each other by an electric field formed between them. The decorative sheets block ion travel through the field and become electrostatically charged, resulting in adhesion between the two sheets and the particleboard. With this arrangement, the voltage differential between the charging bars can be substantial. The sizeable voltages cause higher levels of charge to be deposited on the decorative sheets, which results in the highest level of electrostatic adhesion. This method of charging materials is generally used in the most difficult pinning applications. Dual polarity BP-Series power supplies are designed for applications like this.

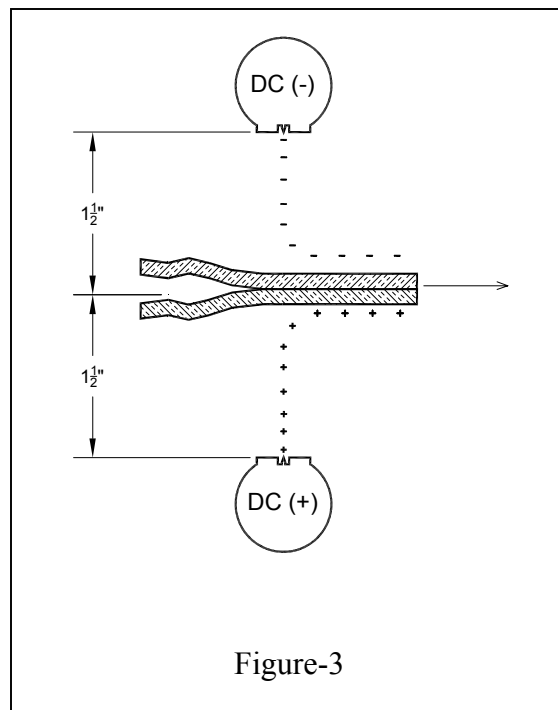


Figure-3

MOUNT CHARGING BARS

CAUTION

Fire Hazard – Do not install or operate equipment in close proximity to any flammable solvents or flammable materials.

CAUTION

Electrical Shock Hazard – Only qualified service personnel are to perform installation tasks.

CAUTION

Electrical Shock Hazard – It is essential that the machine frame, and all metal parts in the vicinity, be grounded either through well-grounded electrical conduit or by heavy copper wire connecting the frame to a water pipe.

Section 4 – Installation

CAUTION

Electrical Shock Hazard – Do not use metal fasteners to secure bar.

NOTE

Use insulated standoffs (see Figure-4) whenever mounting the charging Bar to metal (conductive) frames. Omitting standoffs is recommended ONLY when mounting to nonconductive frames.

1. Determine best location for the Tetra Bar using the above applications for guidance.
2. Drill clearance holes for 3/8-16 mounting bolts for mounting the charging bar. For bars over 4 feet long, use intermediate supports centered on the bar. Extra mounting kits are supplied with longer bars.
3. The mounting clamps of the Tetra Bar can be configured in two different ways; with or without standoffs (see Figure-4). Use standoffs for mounting to metal (conductive) frames. Omit standoffs only for mounting to nonmetallic frames such as fiberglass, PVC, polycarbonate, etc.
4. Assemble clamp halves together loosely using supplied #8 x 1" self threaded screws.
5. Capture the head of the nylon mounting bolt between the two clamp halves. Rotate the bolt until the flats of the head slip securely into the mating groove in the clamp.
6. Slide clamp assemblies onto the Tetra bar and position at the approximate mounting points.
7. Secure the mounting clamps and

Tetra bar to the machine frame, tightening mounting nuts finger tight only.

8. Rotate the tetra bar within the clamp halves to align ion emitter points facing the grounding reference or material being charged.

NOTE

Do not rotate Tetra bar beyond the point where the white inner bar contacts the mounting clamps.

9. With the charging bar in place, securely tighten the #8 x 1" screws until the clamp halves come firmly together.
10. Confirm that the nylon mounting nut is finger-tight, then tighten an additional 1/4-turn with a wrench. Lock in place with a second nut tightened against the first (finger-tight plus 1/4-turn).

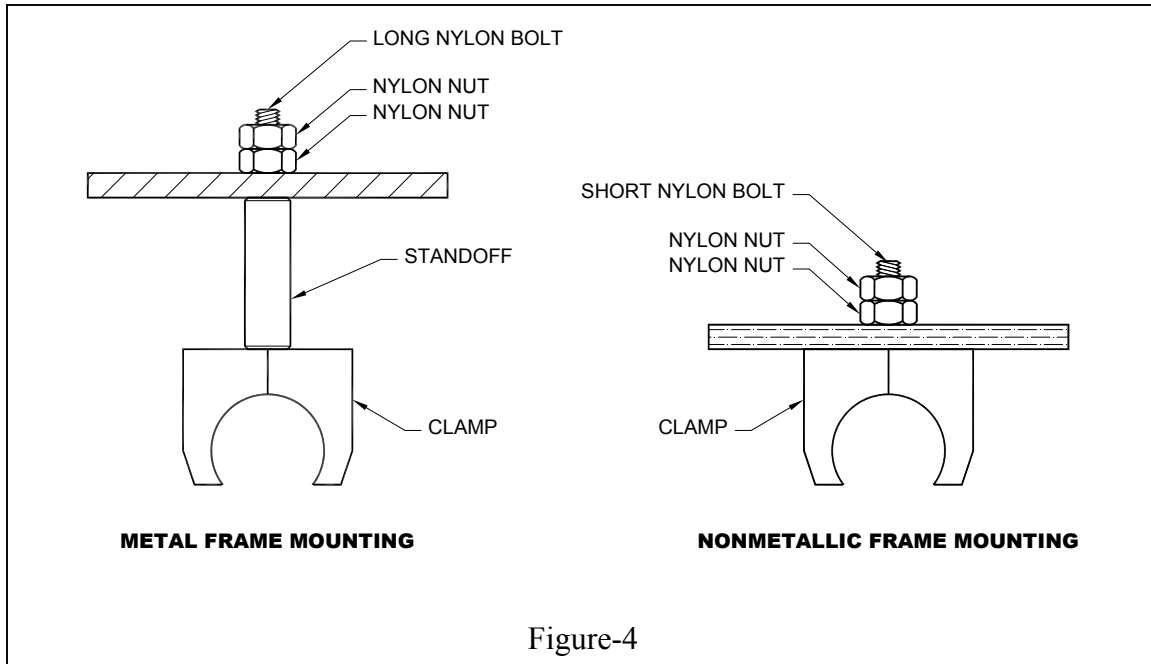
C. INSTALL HIGH VOLTAGE CABLES:

CAUTION

Electrical Shock Hazard – Turn off power supply before connecting high voltage cable.

1. Attach cable to the Tetra bar by screwing the spring-loaded connector into the bar receptacle finger-tight plus 1/8 turn with a wrench.
2. Route the high voltage cables attached to each charging bar along the machine frame or wall to the power supply.
3. Cable supports are used to guide

Section 4 – Installation



- the cables back to the power supply. All cables must be kept a minimum of 1/4" away from machine frame and parts, walls and ceilings.
4. Ensure that the power supply is deenergized, and then remove the protective plastic plug from the power supply high voltage connection by gently prying with an insulated screwdriver.
 5. Insert the cable (with spring loaded connector attached) into the power supply high voltage connection. Screw in the knurled plug to secure the cable. NOTE – FINGER TIGHTEN ONLY.

Section 5 – Operation

CAUTION

Electrical Shock Hazard – Do not touch Charging Bar during operation.

CAUTION

Fire Hazard – Do not operate equipment in close proximity to any flammable solvents or flammable materials.

1. Before energizing any power supply:
 - Ensure that all power supplies are properly grounded.
 - Ensure that all charging bars have been properly located, positioned and installed.
 - Ensure all requirements printed in the applicable power supply instructions have been fully complied with.
2. After the above checks have been performed, simply energize the power supply to operate the Tetra charging bar.
3. Setting Strength of Pinning:
 - If charging bar is arcing or pinning strength is too great, slowly decrease operating voltage of the power supply.
 - If adhesion or pinning strength is not adequate, slowly increase operating voltage of the power

supply.

4. Always turn the power supply OFF when the system is not in use. For safety and ease of operation, it is recommended to connect the power supply line cord to the electrical system of the machine in such a manner that the power supply is only energized when the machine is in operation.

NOTE

Sustained operation while arcing will likely interfere with operation of the charging system. Arcing reduces output voltage from the power supply and suppresses the charging process. Sustained arcing may also damage the bar and power supply.

Section 6 – Troubleshooting

NOTE - Only qualified service personnel are to perform troubleshooting tasks.

1. Troubleshooting arcing from Charging Bar to the target material:

- Arcing can occur between the bar and a ground reference beneath the target material. This arcing typically occurs at edges of material being charged and comes from the ion emitter points at the end of the charging bar. Eliminate this arcing by gradually reducing the operating voltage from the power supply. If reducing the voltage is undesirable due to reduced pinning strength, use snap-on point covers to shield ion emitter points at ends of the bar. Snap-on point cover material can be cut to fit around mounting brackets or overlapped if necessary.

2. Troubleshooting arcing from Charging Bar to machine frame:

- If arcing occurs between the bar and frame member on which the bar is mounted, the bar may be improperly mounted. Verify that all equipment has been properly mounted and grounded.
- If arcing occurs from the end of the bar to the side frame of the machine, slide the bar away from the side frame if possible. If it is not possible to do this, install the arc shield provided. Prepare the frame by cleaning off dirt and grease using alcohol or other suitable solvent. After the solvent has dried completely, remove backing off

the self-adhesive strips of the arc shield. Center the arc shield on the location where the electrical arc contacted the machine frame and firmly press it into place.

3. Troubleshooting low pinning strength:

- If pinning strength is not adequate and the power supply is already at maximum output voltage, moving the bar closer to the target material can increase pinning strength. Reduce the bar-to-material distance until pinning strength is adequate. At this new distance, it may be necessary to adjust the operating voltage of the power supply to avoid arcing, or use snap-on point covers to shield ion emitter points over exposed ground areas.

Section 7 – Maintenance

NOTE

Only qualified service personnel are to perform maintenance tasks.

CAUTION

Electrical Shock Hazard – Deenergize all power supplies before performing any maintenance tasks.

Dust or dirt around the emitter pins will reduce the effectiveness of the Pinner Bar. The bar must be cleaned periodically to prevent deposits from accumulating:

1. Deenergize all power supplies before performing any maintenance tasks.
2. The cleaning brush supplied with the bar should be used periodically to keep the emitter pins clean and prevent deposits from accumulating.

NOTE

Never use hard or sharp objects to scrape emitter pins. Pins must remain sharp for optimal performance.

3. Clean, dry compressed air may also be used to remove loose particulate

from the bar.

4. Wipe the bar and emitter pins with isopropyl alcohol applied to a clean dry cloth to remove ink or resistant coatings.

NOTE

The alcohol must not contain additives. Never use harsh solvents such as lacquer thinner, naphtha or acetone; they will attack the bar housing material.

NOTE

Do not pour alcohol directly onto the bars, and do not soak the bar or any of its components in alcohol.

CAUTION

Fire Hazard – Ensure all traces of alcohol have been removed and the static bar is completely dry before energizing the power supply.

Section 8 – Replacement Parts

Cable Support, 7/16" diameter cable	4104946
SLCC HV Connector Kit (30 kV)	4100286
Nylon Cleaning Brush	4670204
High Voltage Cable Assembly, 10 ft (Includes preassembled cable and supports)	5050322
Tetra Bar Mounting Clamp Kit (Includes clamps, standoff spacer and hardware)	4104458
Arc Shield	4104399
Snap-On Point Covers:	
15" Long	4401656
30" Long	4401655
60" Long	4401649

Section 9 - Warranty

This product has been carefully tested at the factory and is warranted to be free from any defects in materials or workmanship. Simco Industrial Static Control will, under this warranty, repair or replace any equipment which proves, upon our examination, to have become defective within one year from the date of purchase.

The equipment being returned under warranty should be shipped by the purchaser to SIMCO Industrial Static Control, 2257 North Penn Road, Hatfield, PA 19440, transportation prepaid and insured for its replacement cost. Prior to returning any goods for any reason, contact SIMCO Industrial Static Control Customer Service at 215-822-6401 for a Return Authorization Number. This number must accompany all returned items.

This warranty does not apply when the equipment has been tampered with, misused, improperly installed, altered, has received damage through abuse, carelessness, accident, connection to improper line voltage, or has been serviced by anyone other than an authorized factory representative.

The warranty does not apply when SIMCO Industrial Static Control parts and equipment have been energized by other than the appropriate SIMCO Industrial Static Control power supply or generator, or when a SIMCO Industrial Static Control power supply or generator has been used to energize other than SIMCO Industrial Static Control parts and equipment. SIMCO Industrial Static Control makes no warranty, expressed or implied, nor accepts any obligation, liabilities, or responsibility in connection with the use of this product other than the repair or replacement of parts stated herein.