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# INSTALLATION INSTRUCTIONS FOR HEVI-BAR II CONDUCTOR BAR SYSTEMS

APPLICABLE FOR THE FOLLOWING CONDUCTOR BAR TYPES:

*[Standard sizes highlighted in bold]*

- ALUMINIUM / STAINLESS STEEL ⇒ 400Amp rated
- ALUMINIUM / STAINLESS STEEL ⇒ **700 Amp rated**
- ALUMINIUM / STAINLESS STEEL ⇒ 800 Amp rated
- ALUMINIUM / STAINLESS STEEL ⇒ **1000 Amp rated**
- ALUMINIUM / STAINLESS STEEL ⇒ **1500 Amp rated**

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NOTE: For additional information or assistance please contact;

INSUL-8 (AUSTRALIA) PTY. LTD.

Melbourne	Phone	61 (03) 9706 8844	Fax	61 (03) 9794 9298
Sydney	Phone	(02) 9662 4188	Fax	(02) 9682 4100
Brisbane	Phone	(07) 3219 6911	Fax	(07) 3344 5377

Email: info@insul-8.com.au

# 1. RECOMMENDED TOOLS

## 1.1 TOOLS RECOMMENDED FOR INSTALLATION OF HEVI-BAR II SYSTEM

- Two wire brushes (one for use at ground level, one for use at runway level)
- Linoleum knife
- A tape measure
- A thermometer with probe
- A power drill, with a **6mm** drill bit and a **20mm** drill bit
- A hammer
- Two torque wrenches (one for use at ground level, one for use at runway level) with **13mm** and **19mm** sockets.

# 2. HANDLING INSTRUCTIONS

## 2.1 UNLOADING AND HANDLING OF HEVI-BAR II COMPONENTS

- 2.1.1 Because of their extreme length, Hevi-Bar II conductor bars are shipped in custom-made wooden crates. Take care when handling these long boxes. In handling these crates, or when handling individual lengths of conductor bar, use a **4m** wide spreader with two slings. If unloading with a forklift, a boom and spreader must still be used.
- 2.1.2 Do not use the conductor system as a support in any way. The system is not designed to withstand heavy loads, such as ladders.
- 2.1.3 Should it be necessary to clean the conductor system, use only good quality bio-degradable detergent / soap and warm water. **Do not use solvents, acids or alkalis and avoid contact with oils and grease.**
- 2.1.4 Prior to installation, check quantities of parts supplied against the delivery docket and check that no damage has occurred in transit.
- 2.1.5 Expansion Sections and Insulated Sections are often supplied incorporated into a length of conductor bar. As these sections consist of joined discontinuous lengths of bar, they are relatively fragile and, as such, are specially packed for transport. Do not remove shipping supports from Expansion Sections or Insulated Sections until they have been installed on the runway.
- 2.1.6 Please read this installation manual in its entirety prior to commencing installation.

## 3. INSTALLATION INSTRUCTIONS

### 3.1 SUPPORT BRACKETS

- 3.1.1 Support brackets are usually supplied by the customer. We do not have a standard Hevi-Bar II support bracket, but we are happy to quote for supply of brackets to the customers specifications. Hanger clamps are most easily installed on the brackets on the ground (as described in 3.2.1 below), prior to connecting support brackets to the runway beam.
- 3.1.2 Attach the support brackets to the runway beam (via bolting or welding) at the correct pitch, **i.e., maximum 3.0 metre centres for 700A bar and above**. At all times care should be taken to ensure that the support brackets do not coincide with the conductor bar joints. Ensure a minimum clearance of **450mm** between conductor joints, powerfeeds and expansion assemblies and any mounting bracket.

### 3.2 HANGER CLAMPS

- 3.2.1 It is easiest to fit the hanger clamps to the support brackets prior to attaching these to the runway beam. Place bolts through mounting hole in brackets and attach flat washer, lock washer and nut, and finger tighten only. (Nuts are only firmly tightened after the conductor bars have been installed).

### 3.3 ANCHOR PINS

- 3.3.1 Anchoring is achieved by installing anchor pins either side of a standard hanger clamp. Anchor quantities and locations are dependent on the length of system and the presence of expansion sections.
- 3.3.2 Systems without expansion sections, install anchor at centre of run.
- 3.3.3 For systems with 1 expansion section, generally anchor midway between expansion section and end of run. Note that maximum distance to anchor point is **35m**, either side of the expansion section.
- 3.3.4 For systems with more than one expansion section, anchor midway between expansion sections (in addition to anchoring the end sections as described in 3.3.3). As expansion sections are usually located at 70m centres, therefore, anchor points are also generally at **70m** centres.
- 3.3.5 Using a **6mm** drill bit, drill a hole through the cover and bar in the groove where the clamp grips the conductor bar cover, immediately adjacent to the hanger clamp. Drill a second hole adjacent to the other side of the hanger (hole spacing 25.4mm centre-to-centre). Ensure that the holes are drilled as straight as possible, parallel to the top of the bar.
- 3.3.6 Insert the glass-filled polyester anchor pins in the holes. If pins are not a force fit, an RTV type compound may be used to ensure pin is properly secured.

### 3.4 MOUNTING CONDUCTOR BAR

- 3.4.1 Prior to lifting the conductor bars up into position, the splice assembly may be fitted to one end of the bar, as described in 3.5.2 below.
- 3.4.2 Hoist 9 metre lengths of conductor bar up into position using three ropes. A minimum of three people should be at runway level to ensure safety of installers and proper handling of the conductor. Push the conductor bar into the hanger clamps until it locks into position. Slight tilting (ie, lateral rotation) of the bar may be necessary to ensure that the bar locks firmly into both lips of the hanger clamp.
- 3.4.3 Once the conductor bars are installed in the hanger clamps, the finger-tight hanger clamp bolts can be fully tightened. Tighten the nut on top of each clamp to a maximum torque of **20 Nm**. Check that the hanger clamps do not rotate during tightening but remain aligned parallel with the runway.
- 3.4.4 Wherever possible, start the installation of the conductor bars from one end and proceed to work towards the opposite end.

### 3.5 JOINING CONDUCTOR BARS

- 3.5.1 Hevi-Bar II conductor bars are joined using splice assembly kits. Note that the aluminium contact surfaces of the bar and the splice plate must be cleaned and prepared with contact grease (wire brushed in), prior to jointing.
- 3.5.2 For ease of installation, the splices can be prefitted to one end of conductor bars whilst they are on the ground, prior to lifting the bars to runway level. Apply joint compound to top of the exposed conductor bar, and wire brush it in. Apply joint compound to underside of splice plate and wire brush this in. Slide three hex head bolts and the bolt retainer into the slot on the top of the bar, and put the splice plate over the bolts. Attach flat washer, Belleville washer and nut, and tighten to 20Nm maximum torque. Do not overtighten. The conductor bar can then be installed at runway level as described in Section 3.4 above.
- 3.5.3 Raise the next bar to be jointed to runway level and snap it into the hanger clamps, leaving a small working space between the splice plate of the first bar and the end of the bar that is about to be attached. Apply joint compound to the top surface of the second bar where splice plate will attach and wire brush it in. Slide three cup head bolts into the slot in the second bar, ease the bar down slightly, and slide the second bar toward the first until the bar ends butt together. Manoeuvre the three bolts through the holes in the splice plate, attach flat washer, Belleville washer and nut, and tighten to **20Nm** maximum torque.
- 3.5.4 Snap splice cover in place, centered over the splice connection.
- 3.5.5 Once splice connection is completed, proceed to fully tighten nuts on the hanger clamps supporting the second bar (as detailed in 3.4.3, above).

### 3.6 POWERFEED ASSEMBLIES

- 3.6.1 Powerfeed assemblies consist of a feeder cable connecting clamp and a snap-on insulating cover. For higher amperage powerfeeds, the powerfeed assemblies consist of two clamps and a longer snap-on insulating cover. Note that it may be more convenient to install powerfeed clamps onto conductor bars whilst they are on the ground, prior to lifting the bars up to runway level.
- 3.6.2 Powerfeed assemblies may be installed anywhere within a length of conductor bar, as long as they don't correspond with splice or hanger locations (allow a minimum clearance of **450mm**). A length of **100mm** of the insulating cover must be removed from the bar to permit the installation of **one** powerfeed clamp. Alternatively, a length of **200mm** of the insulating cover must be removed from the bar to permit installation of **two** powerfeed clamps. The insulating cover can be cut and removed using a linoleum knife.
- 3.6.3 Using a **20mm** drill bit, drill ONE hole in the slot on top of the bar at one end of the cover opening. Apply joint compound to top of the bar and wire brush it in. Slide the head of two carriage bolts (per powerfeed clamp) down the **20mm** hole and move the bolts along the bar, away from the hole. Position each set of powerfeeds over the bolts (after first applying joint compound and wire brushing the contact surface of the powerfeed clamp). Install the flat washer, Belleville washer and the nut, and tighten loosely. [If powerfeed clamps are install at ground level, the bar can now be lifted and installed at runway level].
- 3.6.4 Install feeder cables in the clamps and fully tighten nuts to a maximum torque of **20Nm**, prior to installing snap-on insulating cover centrally over the powerfeed clamp region.

### 3.7 EXPANSION SECTIONS

- 3.7.1 Expansion Sections are usually located at **70m** centres (under normal environmental conditions). Note that they may be required at closer centres in systems which are subject to high ambient temperature conditions, at all structural building expansion joints, where systems are partly indoor and partly outdoor, and where parts of the system are exposed to localized heat.
- 3.7.2 The expansion section is supplied incorporated as part of a **6m** long section of conductor bar. The expansion section assembly is installed in the same way as installing a length of conductor bar, with respect to hanger supports and joining of bars (including same contact surface preparation as required for standard splice connections). Use special care during installation to ensure that expansion section is not twisted. Once expansion section is in place on the runway, you may remove the shipping supports.
- 3.7.3 Once the expansion section assembly is installed, the expansion gap needs to be set. Refer the the "Expansion Gap Settings" chart to adopt the correct expansion gap based on the ambient temperature at the time on installation. Proceed to install subsequent conductor bars, and then when reaching the next anchor point location, ensure that the expansion gap is correct prior to installation of the anchor pins.

### 3.8 END CAPS

- 3.8.1 End caps are used to insulate the exposed conductor bar ends at each end of the runway. The caps are designed to simply push on. They may be glued in place using electrical conduit glue, if desired.

### 3.9 COLLECTORS

- 3.9.1 For 200A Single Collector (P/N 24060) and 400A Tandem Collector (P/N 24061) the collector mounting arm (**25mm square bar**) must be installed and adjusted so that its centreline is **150mm** from the contact surface of the bar.
- 3.9.2 For 300A Single Collector (P/N 98985) and 600A Tandem Collector (P/N 98984) the collector mounting arm (**38mm square bar**) must be installed and adjusted so that its centreline is **225mm** from the contact surface of the bar.
- 3.9.3 Align the collectors so that they run directly beneath the conductor bars. This will ensure maximum shoe life and permit full articulation of the collector head.

### 3.10 FIELD CUTTING OF CONDUCTOR

- 3.10.1 Using a hacksaw, cut completely through the PVC insulation and the metal of the bar. Ensure that the end of the bar is cut square.
- 3.10.2 Using a linoleum knife, cut back the PVC insulation cover **120mm** for 700Amp bar, or **140mm** for higher amperage bars.
- 3.10.3 Chamfer opening edges of conductor cover legs back **8mm x 45°** angle.
- 3.10.4 With a flat file, file stainless steel edge **1.6 – 2mm x 45°**. Ensure that no burrs or sharp edges are left on stainless steel and aluminium.