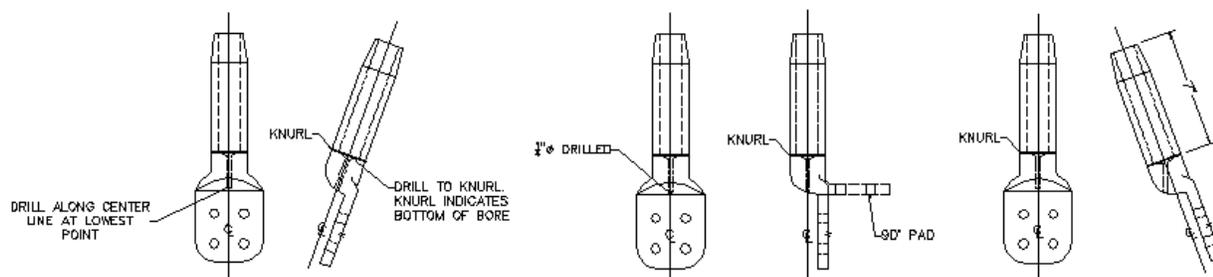


## COMPRESSION CONNECTORS INSTALLATION INSTRUCTIONS

- Step 1: Thoroughly clean the conductor contact surface with a stainless steel wire brush. Do not attempt to clean the power connector barrel. All compression power connectors have sealant applied at the factory. No additional sealant is needed.
- Step 2: The conductor should be straightened, fully inserted into the connector barrel, and crimped with the proper die. A method to insure full insertion is to lay the end of the cable at the knurl next to the barrel and mark the cable at the end of the barrel.
- Step 3: A. For sleeve type power connectors (repair sleeves and non-tension splices), crimping should begin at the knurl marked on the connector near the center of the barrel. For tee type compression connectors (cable to cable, cable to pad) crimping should begin as close as possible to the pad or cable tap. Crimping should move toward the end of the barrel with 1/2" to 3/4" overlaps to allow complete compression of the connector.
- B. For closed barrel type power connectors, begin the crimping at the knurl marked near the closed end of the connector. Crimp the full length of the connector in a continuous manner overlapping 1/2" to 3/4".
- Step 4: The excess sealant that is squeezed out of the connector should be smoothed around the mouth of the barrel. All excess sealant must be removed from the EHV connectors and any conductor insulation.
- Step 5: If the connector is subject to freezing and is installed such that the barrel may collect water then a 1/4"Ø weep hole may be drilled from the lowest point of the barrel into the end of the bore. This will allow water to escape and prevent connector failure due to ice expansion. Illustrations are of typical installations. It is the responsibility of the installer to verify the appropriate weep hole location.



- Step 6: File and sand all rough edges caused by the compression process.

## ALUMINUM BOLTED CONNECTORS INSTALLATION INSTRUCTIONS

- Step 1: Clean all contact surfaces of the connector and conductor thoroughly with a stiff stainless steel wire brush or sandscreen capable of removing the oxidation film. Remove all contaminants and oxides. A typically bright aluminum surface should result. PLATED CONTACT SURFACES SHOULD NOT BE WIRE BRUSHED.
- Step 2: All contact areas should be coated immediately with a liberal amount of contact sealant (Alcoa #2 EJC or equal). A maximum of two minutes is allowed between completion of the cleaning process and application of the contact sealant.
- Step 3: Install the power connector onto the conductor or other terminal with bolts finger tight only. A significant amount of sealant should appear around the connection. If this is not the case, remove the connector and add additional sealant.
- Step 4: Alternately, in a diagonal pattern, tighten bolts evenly to the SEFCOR recommended torque values.
- Step 5: For Non-EHV power connectors, excess sealant may be left as is or lightly smoothed along the contact line.
- Step 6: For EHV power connectors, all excess sealant must be completely removed.
- Note: For aluminum power connectors with a copper liner to copper connection, Steps 1 through 6 should be followed for maximum protection. However, the use of contact sealant is not absolutely necessary.

### RECOMMENDED HARDWARE TORQUE VALUES

Dia.	Stainless Steel			Aluminum			Galvanized Steel		
	in-lb	ft-lb	N-m	in-lb	ft-lb	N-m	in-lb	ft-lb	N-m
3/8"	180	15	20.3	180	15	20.3	180	15	20.3
1/2"	300	25	33.9	300	25	33.9	300	25	33.9
5/8"	480	40	54.2	480	40	54.2	480	40	54.2
3/4"	720	60	81.3	720	60	81.3	720	60	81.3

The torque values assume the following: Hardware consists of a hex head bolt, hex nut and spring lock washer. Aluminum nuts are wax lubricated and used with non-lubricated bolts. Galvanized steel hardware is not lubricated. Stainless steel nuts are wax lubricated and used with non-lubricated bolts. No additional lubrication is used during installation.

## BRONZE BOLTED CONNECTORS INSTALLATION INSTRUCTIONS

- Step 1: Clean all contact surfaces of the connector and conductor thoroughly with a stiff stainless steel wire brush or sandscreen capable of removing the oxidation film. Remove all contaminants and oxides. PLATED CONTACT SURFACES SHOULD NOT BE WIRE BRUSHED.
- Step 2: Contact sealants are not normally required in copper connections. The use of sealants is recommended in severe corrosive environments and for direct burial applications such as ground grids.
- Step 3: Install the power connector onto the conductor or other terminal with bolts finger tight only.
- Step 4: Alternately, in a diagonal pattern, tighten bolts evenly to the SEFCOR recommended torque values.

### RECOMMENDED HARDWARE TORQUE VALUES

Dia.	Silicon Bronze			Stainless Steel			Galvanized Steel		
	In-lb	ft-lb	N-m	in-lb	ft-lb	N-m	in-lb	ft-lb	N-m
3/8"	240	20	27.1	180	15	20.3	180	15	20.3
1/2"	480	40	54.2	300	25	33.9	300	25	33.9
5/8"	660	55	74.6	480	40	54.2	480	40	54.2
3/4"	840	70	94.9	720	60	81.3	720	60	81.3

The torque values assume the following: Hardware consists of a hex head bolt, hex nut and spring lock washer. Silicon bronze Hardware is not lubricated. Galvanized steel hardware is not lubricated. Stainless steel nuts are wax lubricated and used with non-lubricated bolts. No additional lubrication is used during installation.

## **ALUMINUM WELDED CONNECTORS INSTALLATION INSTRUCTIONS**

Aluminum welded connections are typically made between sand castings, extruded aluminum shapes or aluminum cable and welded using 4043 alloy filler rod.

### ALUMINUM CONNECTOR TO ALUMINUM CABLE

- Step 1: Remove all oil, grease and moisture in the vicinity of the surfaces to be welded. Completely clean the conductor and power connector welding areas with a clean stainless steel wire brush.
- Step 2: Slide the cable into the weldment cavity until it is within 1/8" to 3/16" of the rear of the welding barrel.
- Step 3: Before welding, the welding machine settings should be tested by making a test bead on an aluminum casting.
- Step 4: Puddle weld the end of the connector barrel adjacent to the contact pad to the end of the cable, insuring that all aluminum strands are thoroughly fused together. If welding ACSR you must bridge over the steel strands to cover them completely.
- Step 5: For EHV applications especially, grind and clean the weld as needed to leave a smooth corona free finish.

### ALUMINUM CONNECTOR TO ALUMINUM TUBING

- Step 1: Thoroughly clean the conductor and power connector in the areas to be welded. Insure that all oil, grease, and moisture is removed in the vicinity of the surfaces to be welded
- Step 2: Align the tubular bus and the power connector groove. Begin the weld by "burning into" the casting and proceeding into the tubing. Try a test bead prior to welding the connection to test the welding machine settings.
- Step 3: Due to the manufacturing tolerances of aluminum tubing, the tubing should be positioned in the weldment cavity and tack welded before starting the final weld.
- Step 4: When multiple weld passes are required, wire brush the original weld before proceeding to the next pass.
- Step 5: For EHV applications especially, grind and clean the weld as needed to leave a smooth corona free finish.

(continued on next page)

## **ALUMINUM WELDED CONNECTORS INSTALLATION INSTRUCTIONS (continued)**

### SPLICING ALUMINUM TUBING TO ALUMINUM TUBING

- Step 1: Remove all oil, grease and moisture in the vicinity of the surfaces to be welded. Completely clean the conductor and power connector welding areas with a clean stainless steel wire brush. The external edge of the aluminum tubing should be chamfered to 45 degrees.
- Step 2: Try a test bead prior to welding the connection to test the welding machine settings.
- Step 3: Align the splice inside the tubular bus so that center drive pin or marking is at the splice point. Due to the manufacturing tolerances of aluminum tubing, the tubing should be tack welded before starting the final weld.
- Step 4: Begin the weld by "burning into" the splice connector and proceeding into both aluminum tubes. Make a weld pass around the entire splice point. Continue with weld passes until the entire thickness of the tubing has been welded. When multiple weld passes are required, wire brush the original weld before proceeding to the next pass.
- Step 5: For EHV applications especially, grind and clean the weld as needed to leave a smooth corona free finish.

### WELDED CONNECTIONS WITH COPPER LINED CONTACT SURFACE

- Step 1: Care must be taken with these connectors to avoid damage to the copper lining. Bolt the copper lined contact section to the mating contact surface or to another suitable heat sink prior to welding.
- Step 2: Weld the connection in accordance with steps above, as applicable. If a heat sink is utilized, allow the connector to cool before removing. Water may be used to cool the connector.

## INSTALLATION TECHNIQUES FOR COPPER TO ALUMINUM CONDUCTORS UTILIZING ALUMINUM CONNECTORS

Aluminum power connectors may be used for making aluminum to copper connections IF PROPER INSTALLATION PRECAUTIONS ARE TAKEN.

### Sealants

Contact sealant may be used in accordance with normal procedures. The sealant prevents oxide formation and electrolytic corrosion by sealing out moisture from the connection area.

Note: The protection only exists as long as the sealant remains in place.

### Bi-Metallic Transition Plates

Aluminum to copper power connections between flat NEMA drilled tongues and bars can be made using bi-metallic transition plates (type ATP). The transition plates are formed from sheets of 80% aluminum and 20% copper that are molecularly bonded together. The use of contact sealant is also recommended. Note: For best protection, position the aluminum connector above the copper connector.

### Hardware

Stainless steel (Alloy 18-8) bolts are recommended for all copper to aluminum connections. The bolts should be installed complete with lock washer, flat washer, and nut. Torque bolts to specifications.

### RECOMMENDED HARDWARE TORQUE VALUES

Dia.	Stainless Steel		
	in-lb	ft-lb	N-m
3/8"	180	15	20.3
1/2"	300	25	33.9
5/8"	480	40	54.2
3/4"	720	60	81.3

The torque values assume the following: Hardware consists of a hex head bolt, hex nut and spring lock washer. Stainless steel nuts are wax lubricated and used with non-lubricated bolts. No additional lubrication is used during installation.

## INSTALLATION TECHNIQUES FOR COPPER OR BRONZE TO ALUMINUM CONDUCTORS UTILIZING COPPER OR BRONZE CONNECTORS

Copper power connectors may be used for making copper to aluminum connections IF PROPER INSTALLATION PRECAUTIONS ARE TAKEN. Note: All recommendations for copper connectors apply equally to bronze connectors.

### **Bi-Metallic Transition Plates**

Copper to aluminum power connections between flat NEMA. drilled tongues and bars can be made using bi-metallic transition plates (type ATP). The transition plates are formed from sheets of 80% aluminum and 20% copper that are molecularly bonded together. The use of contact sealant is also recommended. Note: For best protection, position the aluminum connector above the copper connector.

### **Tin Plating**

Tin plate the portion of the copper connector that is to be in contact with the aluminum. The use of contact sealant is also recommended. (Tin plating may be specified by adding the suffix "TP" for tinned pad or "SND" for tinned all over to the copper connector catalog number).

### **Sealants**

Copper to aluminum power connections between flat NEMA. drilled tongues and bars can be made if sealant is freely used. The sealant prevents oxide formation and electrolytic corrosion by sealing out moisture from the connection area. Note: The protection only exists as long as the sealant remains in place. Transition plates or tin plating are recommended over this method.

### **Hardware**

Stainless steel (Alloy 18-8) bolts are recommended for all copper to aluminum connections. The bolts should be installed complete with lock washer, flat washer, and nut. Torque bolts to specifications.

### RECOMMENDED HARDWARE TORQUE VALUES

Dia.	Stainless Steel		
	in-lb	ft-lb	N-m
3/8"	180	15	20.3
1/2"	300	25	33.9
5/8"	480	40	54.2
3/4"	720	60	81.3

The torque values assume the following: Hardware consists of a hex head bolt, hex nut and spring lock washer. Stainless steel nuts are wax lubricated and used with non-lubricated bolts. No additional lubrication is used during installation.