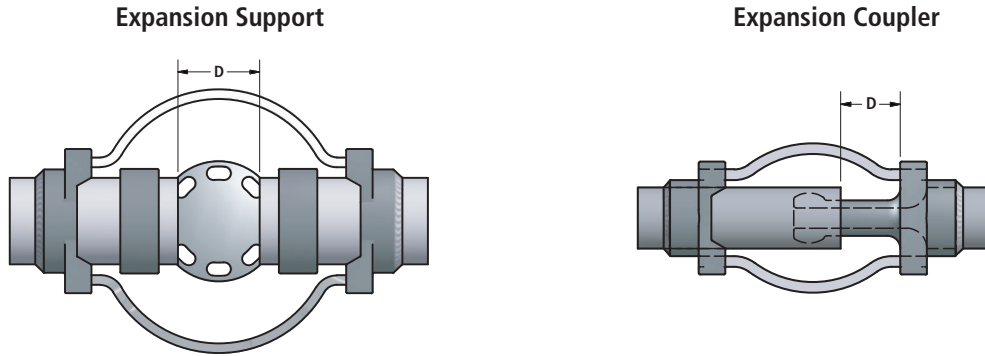


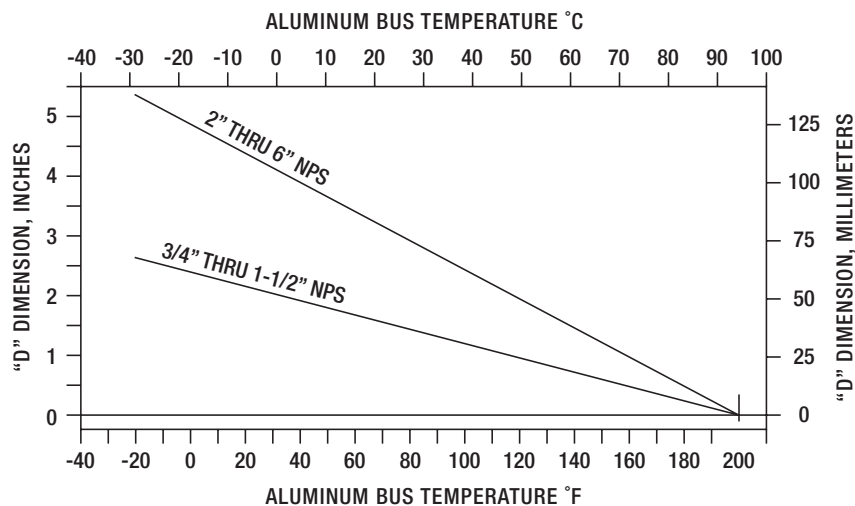
Expansion Couplers and Supports Installation Instructions

Expansion space allows for bus pipes to elongate and shorten with temperature changes while still maintaining functionality of the coupler or support. It is important to make sure that expansion space (dimension "D" on illustrations) is set to the proper distance during installation.



To ensure proper installation, follow these steps.

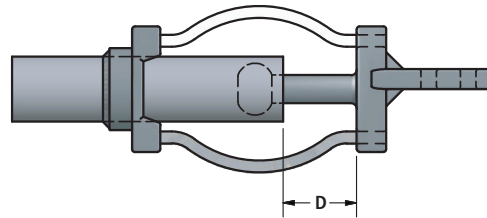
1. Determine the ambient temperature at which the bus pipe is being installed.
2. Based on your temperature reading in step one and the size of your pipe, determine the proper expansion space (dimension "D") for your installation from the graph below. This distance is the same on all types of connection methods to bus pipe, (Bolted, Swage, or Welded.)
3. Compress or expand the assembly until you have set the proper dimension "D" that was determined in step two.



Expansion Terminal Installation Instructions

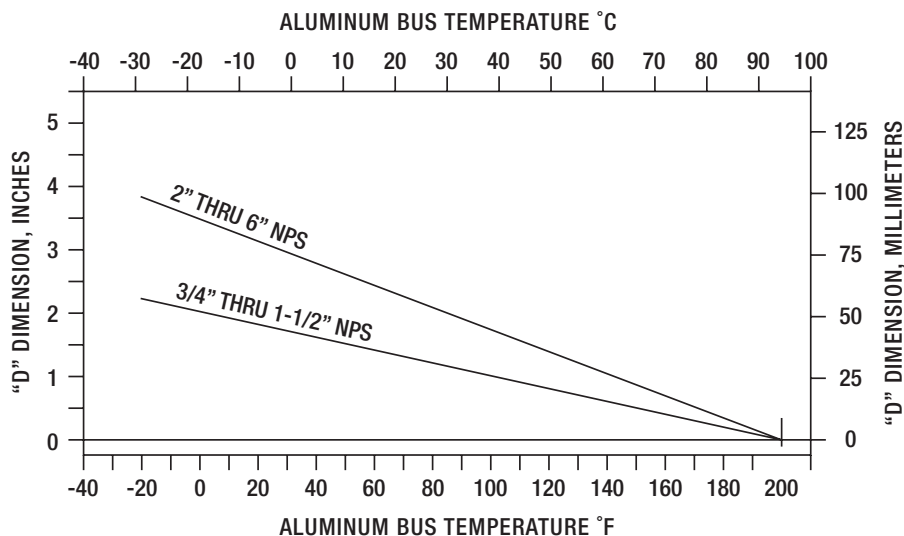
Expansion space allows for bus pipes to elongate and shorten with temperature changes while still maintaining functionality of the terminal. It is important to make sure that expansion space (dimension "D" on illustrations) is set to the proper distance during installation.

Expansion Support



To ensure proper installation, follow these steps.

1. Determine the ambient temperature at which the bus pipe is being installed.
2. Based on your temperature reading in step one and the size of your pipe, determine the proper expansion space (dimension "D") for your installation from the graph below. This distance is the same on all types of connection methods to bus pipe, (Bolted, Swage, or Welded.)
3. Compress or expand the assembly until you have set the proper dimension "D" that was determined in step two.



Installation Instructions

Aluminum Bolted Connectors

1. Clean all contact surfaces of the connector and conductor thoroughly with a stiff stainless steel wire brush or sand screen capable of removing the oxidation film. Remove all contaminants and oxides. Typically a bright aluminum surface should result.
NOTE: Plated contact areas should not be cleaned with a wire brush.
2. All contact areas should be coated immediately with a generous amount of contact sealant. AFL's No. 2 EJC is the recommended compound which provides efficient and trouble-free service on aluminum-to-aluminum and aluminum-to-copper connections. If No. 2 EJC is kept in a dry place, it has an infinite shelf life. **NOTE:** A maximum of two (2) minutes is allowed between completion of the cleaning process and application of the contact sealant.
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.
4. Alternately, in a diagonal pattern, tighten bolts evenly to the recommended torque values.

RECOMMENDED TIGHTENING TORQUE FOR ALUMINUM BOLTS WITH ALUMILITE 205 FINISH AND LUBRICANT COATING

Bolt Diameter (inches)	Torque		Bolt Diameter (inches)	Torque	
	Ft-Lbs	N. m		Ft-Lbs	N. m
3/8	15	20	5/8	40	54
7/16	20	27	3/4	60	81
1/2	25	34			

RECOMMENDED TIGHTENING TORQUE FOR GALVANIZED STEEL BOLTS WITH LUBRICANT COATING

Bolt Diameter (inches)	Torque		Bolt Diameter (inches)	Torque	
	Ft-Lbs	N. m		Ft-Lbs	N. m
5/16	15	20	5/8	60	81
3/8	25	34	3/4	75	102
1/2	40	54			

RECOMMENDED TIGHTENING TORQUE FOR SILICON BRONZE BOLTS

Bolt Diameter (inches)	Torque		Bolt Diameter (inches)	Torque	
	Ft-Lbs	N. m		Ft-Lbs	N. m
5/16-18	11	14	5/8-11	70	94
3/8-16	20	27	3/4-10	100	135
1/2-13	40	54			

RECOMMENDED TIGHTENING TORQUE FOR STAINLESS STEEL (18-8)

Bolt Diameter (inches)	Torque		Bolt Diameter (inches)	Torque	
	Ft-Lbs	N. m		Ft-Lbs	N. m
5/16-18	15	20	5/8-11	55	54
3/8-16	20	27	3/4-10	87	73
1/2-13	40	34			

Ref: PA2014-2960

5. For Non-EHV power connectors, excess sealant may be left as is or lightly smoothed along the contact line.
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.

Installation Instructions

Bronze Bolted Connectors

1. Clean all contact surfaces of the connector and conductor thoroughly with a stiff stainless steel wire brush or sand screen capable of removing the oxidation film. Remove all contaminants and oxides. **NOTE:** Plated contact surfaces should not be cleaned with a stainless steel wire brush.
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.
3. Install the power connector onto the conductor or other terminal with bolts—finger tighten only.
4. Alternately, in a diagonal pattern, tighten bolts evenly to the recommended torque values.

RECOMMENDED TIGHTENING TORQUE FOR ALUMINUM BOLTS WITH ALUMILITE 205 FINISH AND LUBRICANT COATING

Bolt Diameter (inches)	Torque		Bolt Diameter (inches)	Torque	
	Ft-Lbs	N. m		Ft-Lbs	N. m
3/8	15	20	5/8	40	54
7/16	20	27	3/4	60	81
1/2	25	34			

RECOMMENDED TIGHTENING TORQUE FOR GALVANIZED STEEL BOLTS WITH LUBRICANT COATING

Bolt Diameter (inches)	Torque		Bolt Diameter (inches)	Torque	
	Ft-Lbs	N. m		Ft-Lbs	N. m
5/16	15	20	5/8	60	81
3/8	25	34	3/4	75	102
1/2	40	54			

RECOMMENDED TIGHTENING TORQUE FOR SILICON BRONZE BOLTS

Bolt Diameter (inches)	Torque		Bolt Diameter (inches)	Torque	
	Ft-Lbs	N. m		Ft-Lbs	N. m
5/16-18	11	14	5/8-11	70	94
3/8-16	20	27	3/4-10	100	135
1/2-13	40	54			

RECOMMENDED TIGHTENING TORQUE FOR STAINLESS STEEL (18-8)

Bolt Diameter (inches)	Torque		Bolt Diameter (inches)	Torque	
	Ft-Lbs	N. m		Ft-Lbs	N. m
5/16-18	15	20	5/8-11	55	54
3/8-16	20	27	3/4-10	87	73
1/2-13	40	34			

Ref: PA2014-2960

Installation Instructions

Aluminum Welded Connectors

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

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

Aluminum Connector to Aluminum Tubing

1. Thoroughly clean the conductor and power connector in the areas to be welded. Ensure that all oil, grease, and moisture is removed in the vicinity of the surfaces to be welded.
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.
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.
4. When multiple weld passes are required, wire brush the original weld before proceeding to the next pass.
5. For EHV applications especially, grind and clean the weld as needed to leave a smooth corona-free finish.

Splicing Aluminum Tubing to Aluminum Tubing

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.
2. Run a test bead prior to welding the connection to test the welding machine settings.
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.
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.
5. For EHV applications especially, grind, file and clean the weld as needed to leave a smooth, corona-free finish.

Installation Instructions

Aluminum Welded Connectors

Welded Connections with Copper-Lined Contact Surface

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.
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.