

SERVICE BULLETIN

Original Issue Date: **8/05**
 Model: **20-2800 kW**
 Market: **Industrial**
 Subject: **Terminating Lugs to Bus Bar up to 600 Volts (Adapted from G-595)**

Introduction

The purpose of this bulletin is to provide a consistent assembly method for terminating crimp or solderless lugs and compression lugs to a copper bus bar, including information for terminating lug to lug.

Follow the instructions in this bulletin whenever connecting alternator leads to bus bars.

Read the entire service bulletin before servicing lugs. Perform steps in the order shown.

The 500-900 kW multiple lead alternators require part number X-468-41 tie wraps when multiple leads are used on the bus bar.

Note: Procure tie wraps X-468-41 through the Service Parts Department. These 14 in. long, 0.3 in. wide heat-resistant tie wraps are made of Tefzel®, a fluoropolymer resin that withstands temperatures up to 150°C (302°F).

Safety Precautions

Observe the following safety precautions while servicing the unit.

⚠ WARNING



**Accidental starting.
 Can cause severe injury or death.**

Disconnect the battery cables before working on the generator set. Remove the negative (-) lead first when disconnecting the battery. Reconnect the negative (-) lead last when reconnecting the battery.

Disabling the generator set. Accidental starting can cause severe injury or death. Before working on the generator set or connected equipment, disable the generator set as follows: (1) Move the generator set master switch to the OFF position. (2) Disconnect the power to the battery charger. (3) Remove the battery cables, negative (-) lead first. Reconnect the negative (-) lead last when reconnecting the battery. Follow these precautions to prevent starting of the generator set by an automatic transfer switch, remote start/stop switch, or engine start command from a remote computer.

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| Routing | Service Manager | Sales Manager | Parts Manager | Technician No. 1 | Technician No. 2 | Technician No. 3 | Return This to |
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| Initial Here | | | | | | | |

Service Procedure

1. Place the generator set master switch in the OFF position.
2. Disconnect the power to the battery charger, if equipped.
3. Disconnect the generator set engine starting battery(ies), negative (-) lead first.
4. Clean lead terminals and bus of paint/primer, grease, oil, or other foreign material. See Figure 1 for lug-to-bus bar termination. See Figure 2 for lug-to-lug termination.
5. Use a steel washer on the top and bottom of the joint.

6. Torque screw per General Torque Specifications. All hardware must be Grade 5.

7. Protect lug-to-lug connections:

- a. Cover the junction with a minimum of six layers of electrical tape wrapped beyond the lug a minimum of 38 mm (1.5 in.). Each layer must have approximately a 50% overlap.

Note: For 1/0 wire or greater, use ten layers of electrical tape.

- b. Apply a minimum of two layers of friction tape over the mastic pad(s) (or electrical tape) wrapped with approximately a 50% overlap and extending a minimum of 25 mm (1 in.) beyond the tape.

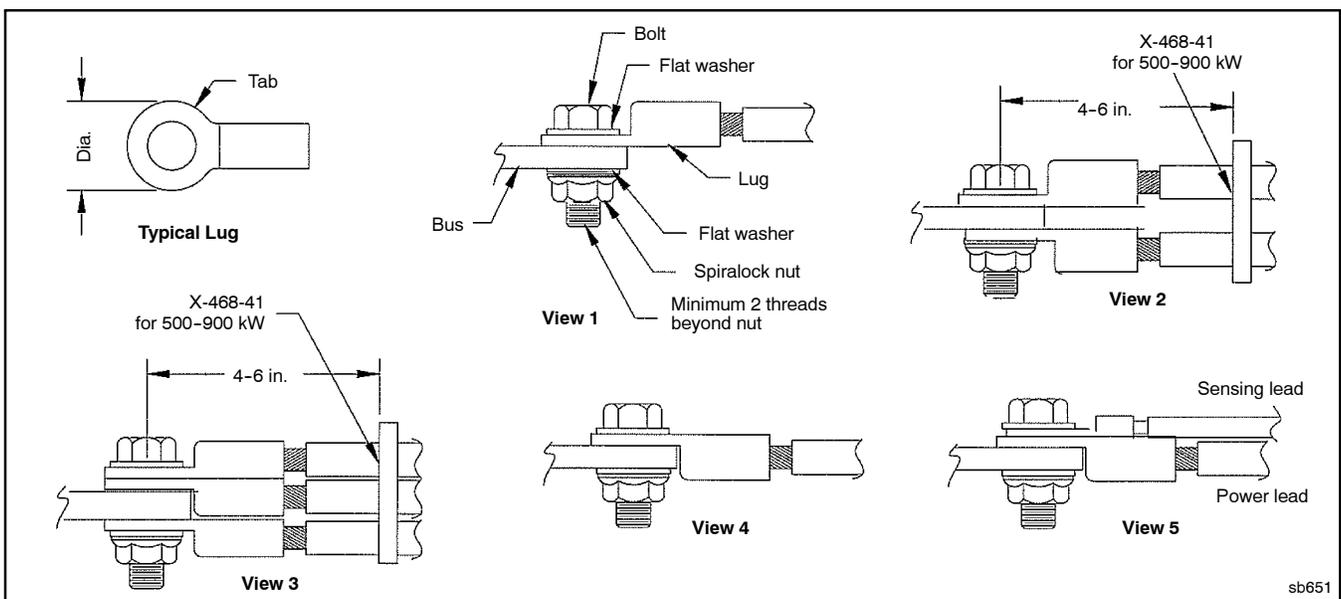


Figure 1 Lug-to-Bus Bar Termination

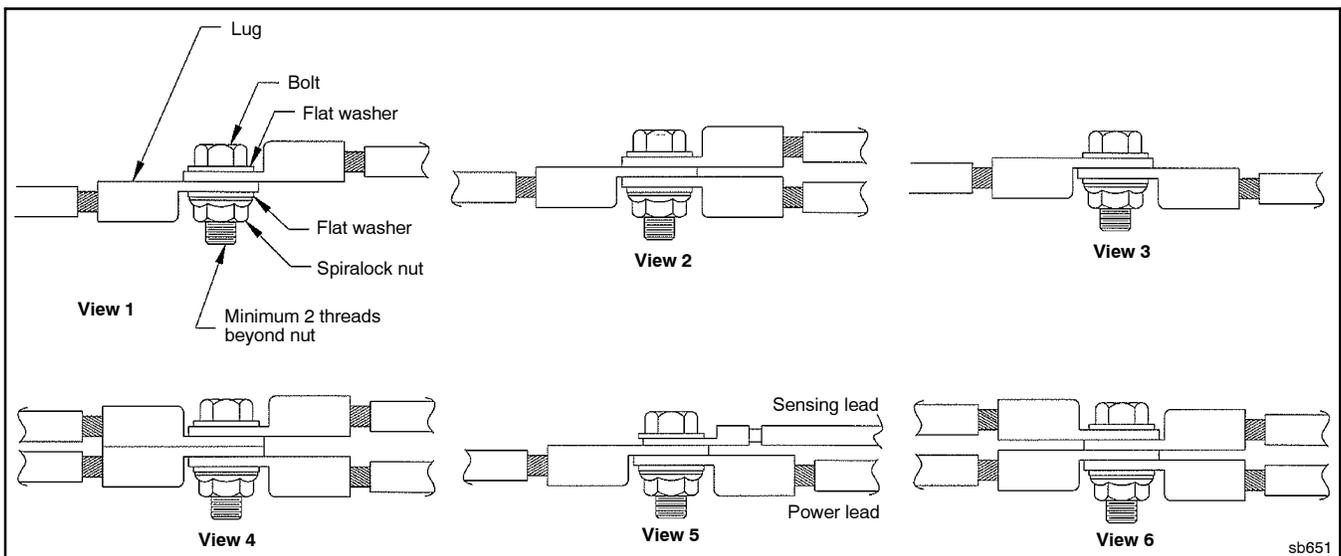


Figure 2 Lug-to-Lug Termination

General Torque Specifications

| American Standard Fasteners Torque Specifications | | | | | |
|---|--------------------|-----------------------------------|-------------|--------------|--------------------------------------|
| Size | Torque Measurement | Assembled into Cast Iron or Steel | | | Assembled into Aluminum Grade 2 or 5 |
| | | Grade 2 | Grade 5 | Grade 8 | |
| 8-32 | Nm (in. lb.) | 1.8 (16) | 2.3 (20) | — | See Note 3 |
| 10-24 | Nm (in. lb.) | 2.9 (26) | 3.6 (32) | — | |
| 10-32 | Nm (in. lb.) | 2.9 (26) | 3.6 (32) | — | |
| 1/4-20 | Nm (in. lb.) | 6.8 (60) | 10.8 (96) | 14.9 (132) | |
| 1/4-28 | Nm (in. lb.) | 8.1 (72) | 12.2 (108) | 16.3 (144) | |
| 5/16-18 | Nm (in. lb.) | 13.6 (120) | 21.7 (192) | 29.8 (264) | |
| 5/16-24 | Nm (in. lb.) | 14.9 (132) | 23.1 (204) | 32.5 (288) | |
| 3/8-16 | Nm (ft. lb.) | 24.0 (18) | 38.0 (28) | 53.0 (39) | |
| 3/8-24 | Nm (ft. lb.) | 27.0 (20) | 42.0 (31) | 60.0 (44) | |
| 7/16-14 | Nm (ft. lb.) | 39.0 (29) | 60.0 (44) | 85.0 (63) | |
| 7/16-20 | Nm (ft. lb.) | 43.0 (32) | 68.0 (50) | 95.0 (70) | |
| 1/2-13 | Nm (ft. lb.) | 60.0 (44) | 92.0 (68) | 130.0 (96) | |
| 1/2-20 | Nm (ft. lb.) | 66.0 (49) | 103.0 (76) | 146.0 (108) | |
| 9/16-12 | Nm (ft. lb.) | 81.0 (60) | 133.0 (98) | 187.0 (138) | |
| 9/16-18 | Nm (ft. lb.) | 91.0 (67) | 148.0 (109) | 209.0 (154) | |
| 5/8-11 | Nm (ft. lb.) | 113.0 (83) | 183.0 (135) | 259.0 (191) | |
| 5/8-18 | Nm (ft. lb.) | 128.0 (94) | 208.0 (153) | 293.0 (216) | |
| 3/4-10 | Nm (ft. lb.) | 199.0 (147) | 325.0 (240) | 458.0 (338) | |
| 3/4-16 | Nm (ft. lb.) | 222.0 (164) | 363.0 (268) | 513.0 (378) | |
| 1-8 | Nm (ft. lb.) | 259.0 (191) | 721.0 (532) | 1109.0 (818) | |
| 1-12 | Nm (ft. lb.) | 283.0 (209) | 789.0 (582) | 1214.0 (895) | |

| Metric Fasteners Torque Specifications, Measured in Nm (ft. lb.) | | | | |
|--|-----------------------------------|-------------|-------------|--|
| Size (mm) | Assembled into Cast Iron or Steel | | | Assembled into Aluminum Grade 5.8 or 8.8 |
| | Grade 5.8 | Grade 8.8 | Grade 10.9 | |
| M6 x 1.00 | 6.2 (4.6) | 9.5 (7) | 13.6 (10) | See Note 3 |
| M8 x 1.25 | 15.0 (11) | 23.0 (17) | 33.0 (24) | |
| M8 x 1.00 | 16.0 (11) | 24.0 (18) | 34.0 (25) | |
| M10 x 1.50 | 30.0 (22) | 45.0 (34) | 65.0 (48) | |
| M10 x 1.25 | 31.0 (23) | 47.0 (35) | 68.0 (50) | |
| M12 x 1.75 | 53.0 (39) | 80.0 (59) | 115.0 (85) | |
| M12 x 1.50 | 56.0 (41) | 85.0 (63) | 122.0 (90) | |
| M14 x 2.00 | 83.0 (61) | 126.0 (93) | 180.0 (133) | |
| M14 x 1.50 | 87.0 (64) | 133.0 (98) | 190.0 (140) | |
| M16 x 2.00 | 127.0 (94) | 194.0 (143) | 278.0 (205) | |
| M16 x 1.50 | 132.0 (97) | 201.0 (148) | 287.0 (212) | |
| M18 x 2.50 | 179.0 (132) | 273.0 (201) | 390.0 (288) | |
| M18 x 1.50 | 189.0 (140) | 289.0 (213) | 413.0 (305) | |

Notes:

1. Do not use these values when the torque values are specified on the assembly drawing.
2. These values are based on new plated threads. Increase values by 15% if non-plated threads are used.
3. Hardware threaded into aluminum must have two diameters of thread engagement or may require 30% or more reduction in the torque.
4. Torques are calculated as equivalent stress loading to American hardware and approximately a preload of 90% of yield strength and friction coefficient of 0.125.

Notes