

**TM105A**

Original Issue

Revision 11

1 Apr., 1991

19 August, 2013



# **OVERHAUL INSTRUCTIONS with ILLUSTRATED PARTS BREAKDOWN STARTER-GENERATOR**

## **MODELS**

|                     |                      |                     |
|---------------------|----------------------|---------------------|
| <b>200SGL111Q</b>   | <b>200SGL124Q</b>    | <b>200SGL132Q-3</b> |
| <b>200SGL111Q-2</b> | <b>200SGL129Q</b>    | <b>200SGL132Q-4</b> |
| <b>200SGL111Q-3</b> | <b>200SGL129Q(1)</b> | <b>200SGL132Q-5</b> |
| <b>200SGL112Q</b>   | <b>200SGL129Q(3)</b> | <b>200SGL142Q</b>   |
| <b>200SGL114Q</b>   | <b>200SGL129Q(4)</b> | <b>200SGL144Q</b>   |
| <b>200SGL115Q</b>   | <b>200SGL129Q(5)</b> | <b>200SGL145Q</b>   |
| <b>200SGL115Q-2</b> | <b>200SGL129Q(8)</b> | <b>200SGL147Q</b>   |
| <b>200SGL117Q</b>   | <b>200SGL130Q</b>    | <b>200SGL147Q-2</b> |
| <b>200SGL118Q</b>   | <b>200SGL131Q</b>    | <b>200SGL147Q-3</b> |
| <b>200SGL119Q</b>   | <b>200SGL131Q-2</b>  | <b>200SGL151Q</b>   |
| <b>200SGL119Q-2</b> | <b>200SGL131Q-5</b>  | <b>200SGL153Q</b>   |
| <b>200SGL120Q</b>   | <b>200SGL132Q</b>    |                     |
| <b>200SGL121Q</b>   | <b>200SGL132Q-2</b>  |                     |

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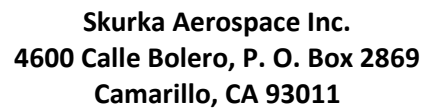
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## RECORD OF REVISIONS

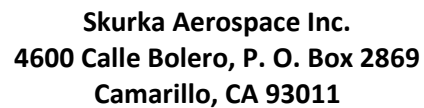
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## SERVICE LETTER CONTROL

| Service Letter Number                                                                                                                                                                                                                                                                  | Revision Level | Latest Rev. Date | Status       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------------|--------------|
| 103                                                                                                                                                                                                                                                                                    |                | Oct. 7, 1993     | Incorporated |
| 113                                                                                                                                                                                                                                                                                    |                | Jan 29, 2001     | Incorporated |
| 114                                                                                                                                                                                                                                                                                    |                | Nov. 1, 1996     | Incorporated |
| 120                                                                                                                                                                                                                                                                                    |                | Aug. 24, 1998    | Incorporated |
| 122                                                                                                                                                                                                                                                                                    |                | Jan. 29, 2001    | Incorporated |
| 127                                                                                                                                                                                                                                                                                    |                | Aug. 11, 1998    | Incorporated |
| 132                                                                                                                                                                                                                                                                                    | B              | Feb. 10, 2010    | Valid        |
| 133                                                                                                                                                                                                                                                                                    |                | Feb. 9, 1999     | Incorporated |
| 134                                                                                                                                                                                                                                                                                    | B              | Dec. 9, 2009     | Valid        |
| 135                                                                                                                                                                                                                                                                                    |                | Feb. 28, 2000    | Incorporated |
| 136                                                                                                                                                                                                                                                                                    |                | May 12, 1999     | Incorporated |
| 138                                                                                                                                                                                                                                                                                    |                | Dec. 15, 1998    | Incorporated |
| 141                                                                                                                                                                                                                                                                                    |                | Mar. 27, 2002    | Incorporated |
| 146                                                                                                                                                                                                                                                                                    |                | July 17, 2000    | Incorporated |
| 147                                                                                                                                                                                                                                                                                    |                | Feb. 26, 2002    | Incorporated |
| 148                                                                                                                                                                                                                                                                                    |                | Jan. 9, 2001     | Incorporated |
| 153                                                                                                                                                                                                                                                                                    |                | Sept. 25, 2001   | Incorporated |
| 159                                                                                                                                                                                                                                                                                    |                | Oct. 29, 2002    | Incorporated |
| 161                                                                                                                                                                                                                                                                                    |                | Nov. 19, 2002    | Incorporated |
| 165                                                                                                                                                                                                                                                                                    | Initial        | Jun. 12, 2003    | Incorporated |
| 168                                                                                                                                                                                                                                                                                    | Initial        | Sep. 29, 2003    | Incorporated |
| 173                                                                                                                                                                                                                                                                                    | A              | Feb. 10, 2010    | Valid        |
| 188                                                                                                                                                                                                                                                                                    | Initial        | Apr. 26, 2006    | Incorporated |
| 191                                                                                                                                                                                                                                                                                    | Initial        | Jul. 21, 2006    | Incorporated |
| 192                                                                                                                                                                                                                                                                                    | A              | Feb. 10, 2010    | Valid        |
| 194                                                                                                                                                                                                                                                                                    | Initial        | Oct. 31, 2008    | Incorporated |
| 199                                                                                                                                                                                                                                                                                    | Initial        | Mar. 15, 2008    | Incorporated |
| 208                                                                                                                                                                                                                                                                                    | Initial        | Dec. 2, 2008     | Incorporated |
| 210                                                                                                                                                                                                                                                                                    | Initial        | Aug. 10, 2009    | Incorporated |
| 224                                                                                                                                                                                                                                                                                    | N/R            | 26 Apr., 2011    | Incorporated |
| 225                                                                                                                                                                                                                                                                                    | N/R            | 25 Jan., 2011    | Incorporated |
| 227                                                                                                                                                                                                                                                                                    | N/R            | 19 Apr., 2011    | Incorporated |
| 230                                                                                                                                                                                                                                                                                    | N/R            | 26 May, 2011     | Incorporated |
| 231                                                                                                                                                                                                                                                                                    | A              | 9 Jan., 2013     | Incorporated |
| 238                                                                                                                                                                                                                                                                                    | N/R            | 20 Oct., 2011    | Incorporated |
| Retain this record in front of Manual. On receipt of Service Letters, record the Service Letter number, status, revision, and date issued. Unless incorporated or rescinded, all Service Letters affecting the 200SGL Series of DC Starter-Generators should be kept with this Manual. |                |                  |              |



(cont'd)

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19 August, 2013



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TECHNICAL DOCUMENTATION SUGGESTION FORM



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## REVISIONS

| Page No.                           | Description                                                                               | Revision Date | Approved         |
|------------------------------------|-------------------------------------------------------------------------------------------|---------------|------------------|
| Cover                              | File TM105A replaces TM105                                                                | 4/1/91        | Approval on File |
|                                    | Added Starter Generators:<br>200SGL121Q<br>200SGL124Q<br>200SGL129Q<br>200SGL130Q         |               |                  |
| Sec IV                             | Changed various hardware P/N's to standardize parts list callouts.                        |               |                  |
| -                                  | Added Sections VI and VII                                                                 |               |                  |
| IIb                                | Added Page to show Section V illustrations                                                | 5/5/92        |                  |
| 4-4<br>4-13                        | Corrected P/N 200SGL1153-2 to P/N 200SGL1153-1                                            |               |                  |
| 5-4<br>5-9<br>5-13<br>5-18<br>5-23 | Revised Testing Procedure for Shunt Start Starter-Generator                               |               |                  |
| 5-5<br>5-14<br>5-19<br>5-24        | Revised Starter-Generator Schematic Diagram to include Speed Sensor                       |               |                  |
| 7-3                                | Changed Brush Seating Paragraph to include Motorizing by APC Service Bulletin 150SG105.SB | 9-3-93        |                  |
|                                    | Entire Manual Retyped (Electronically)                                                    | 9-3-02        |                  |
| Cover                              | Added Starter Generators:<br>200SGL111Q-2<br>200SGL111Q-3<br>200SGL115Q-2<br>200SGL119Q-2 |               |                  |



## REVISIONS

| Page No.         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Revision Date      | Approved            |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------|
| Cover            | 200SGL129Q(5)<br><br>200SGL129Q(8)<br>200SGL132Q<br>200SGL142Q<br>200SGL144Q<br>200SGL145Q<br>200SGL147Q                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 9-3-02<br>(cont'd) | Approval<br>on File |
| I<br>Thru<br>IV  | Added:<br>Parts Distribution and Product Support Information<br>Record of Revisions Table<br>Service Bulletin List Table<br>Service Letter List Table                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                     |
| V<br>Thru<br>VII | Added:<br>Additional Service Information List<br>Moved Sec VI "Brush Life Calculations" to Additional<br>Service Information List and replaced Sec VI with.<br>Maintenance and Test Procedure Difference Data<br>Sheets<br><br>Added:<br>Fig. 2-7, T150SG1073-1 Damper Plate Installation Tool<br>Fig. 2-8, Bearing Pusher (Inner and Outer Race)<br>Fig. 6-3, Hook up for starter test<br>Fig. 6-5 for additional Models<br><br>Fig. 6-2 was Fig. 5-1,5-4,5-6,5-8<br>Fig. 6-4 was Fig. 5-2,5-9<br>Fig. 6-7 was Fig. 5-3<br>Fig. 6-8 was Fig. Fig. 5-5<br>Fig. 6-6 was Fig. Fig. 5-7 |                    |                     |
| 2-3              | Added to Test Equipment: Dynamic Balancer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                     |
| 2-7<br>2-16      | Paragraph 2-11b Updated depth of undercut                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                     |
| 2-9              | Added Note relating to Plating or Rework of Drive End or<br>Commutator housing bearing liners                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                     |



## REVISIONS

| Page No.             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Revision Date      | Approved            |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------|
| 2-22                 | Paragraphs c,d,e Update anti-seize Compound,<br>From: JAN-A-669, TO: 150SG1309                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 9-3-02<br>(cont'd) | Approval<br>on File |
| 2-24                 | Added Fig. 2-7 Damper Plate Installation Tool<br>(T150SG1073-1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                     |
| 2-25                 | Added Fig. 2-8 Bearing Pusher (Inner Race and Outer<br>Race)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                     |
| 2-30                 | Fig. 2-11 Updated Pictorial to show correct orientation of<br>Brush Leads                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                     |
| 4-3<br>Thru<br>4-7   | Part Number AN500A10-12 superseded by MS35265-65<br>Part Number AN535-2-2 superseded by MS21318-13<br>Part Number AN935-8L superseded by 150SG1379-8<br>Part Number AN935-10L superseded by MS35338-43<br>Part Number AN960B616 superseded by AN960C616<br>Part Number MS20364-1032C superseded by SPS27FT-<br>1032<br>Part Number MS20364B-624C superseded by SPS27FT-<br>624<br>Part Number 200SGL1004 superseded by 150SG1004-1<br>Part Number 300SG1222-1 superseded by 300SG1222-2<br>Part Number MS9013-17 superseded by MS16624-4066 |                    |                     |
| 4-9<br>Thru<br>4-21  | Added Additional Models using Usage Codes M thru U<br>Added parts for additional Models<br>Updated Bearings per SB #118 ,123                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                     |
| 4-23<br>Thru<br>4-24 | Updated Fig. 4-1,4-2 for additional Models and updated<br>pictorials for correct part orientation.                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                     |
| 5-3<br>Thru<br>5-13  | Moved the following to Section 6:<br>Magnetic Pick-Up and Spur Gear<br>Speed Pick Up Test<br>Acceleration Run<br>Terminal Block and Generator Wiring Diagram                                                                                                                                                                                                                                                                                                                                                                                |                    |                     |



## REVISIONS

| Page No.             | Description                                                                                                                           | Revision Date      | Approved                                                                             |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------------------------------------------------------------------------|
| 5-14<br>Thru<br>5-22 | Added additional Models                                                                                                               | 9-3-02<br>(cont'd) | Approval<br>on File                                                                  |
| 7-5                  | Update usage code for additional Models                                                                                               |                    |                                                                                      |
| -                    | Added "Additional Service Information List"                                                                                           |                    |                                                                                      |
| -                    | Added Technical Documentation Form                                                                                                    |                    |                                                                                      |
| -                    | Added Service Letter #134,132                                                                                                         |                    |                                                                                      |
| -                    | Added Service Bulletins:                                                                                                              |                    |                                                                                      |
| -                    | 19-SB150SG105                                                                                                                         |                    |                                                                                      |
| -                    | 19-SB150SG114                                                                                                                         |                    |                                                                                      |
| -                    | 19-SB150SG124                                                                                                                         |                    |                                                                                      |
| -                    | 19-SB150SG128                                                                                                                         |                    |                                                                                      |
| Cover                | Added Starter Generator:<br>200SGL129Q(4)<br>Corrected Typing Error:<br>Original Issue Apr. 1. 1991 was Nov. 7, 1983                  | 1-30-03            |  |
| II<br>thru<br>V      | Updated Record of Revisions<br>Updated Service Bulletin List<br>Updated Service Letter List<br>Itemized Service Letters And Bulletins |                    |                                                                                      |
| 2-10                 | Paragraph 2-12b, Added ASTM –E1444 to Magnaflux testing                                                                               |                    |                                                                                      |
| 2-13                 | Paragraph 2-19b, Corrected Typing Error: .33 MFD ± 10% was .022 MFD ± 20%.                                                            |                    |                                                                                      |
| 2-30                 | Figure 2-11, Update Pictorial for clarity                                                                                             |                    |                                                                                      |
| 3-10<br>3-11         | Updated Paragraph 3-17a, 3-17e to reflect Service Letter #161                                                                         |                    |                                                                                      |
| 4-9<br>4-21<br>5-21  | Added additional Model: 200SGL129Q(4) to reflect Service Letter #159                                                                  |                    |                                                                                      |



## REVISIONS

| Page No. | Description                                                                                                                                        | Revision Date       | Approved |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------|
| 4-21     | Removed Usage Code J,Q from 200SGL1009<br>Added Usage Code J,Q to 200SGL1009-10<br>Added Part Number 200SGL1156-4 for Model:<br>200SGL129Q(8)      | 1-30-03<br>(cont'd) |          |
| 7-5      | Removed Usage Code J,Q from 200SGL1064-XL<br>Remove Usage Code J,Q from 200SGL1009-10                                                              |                     |          |
| Cover    | APC address and phone number changes (throughout manual)                                                                                           | 02/28/07            |          |
| 3-5      | Added 'Record readings on test data sheet, Table V.' to paragraph 3-10f.                                                                           |                     |          |
| 3-7      | Revised voltage callout in paragraph 3-13c. Added new paragraph 3-13e - 'Record readings on test data sheet, Table V.'                             |                     |          |
| 3-8      | Revised voltage callouts in paragraphs 3-14a and c. Added 'Record readings on test data sheet, Table V.' to paragraph 3-14a,b,c.                   |                     |          |
| 3-9      | Added Table IV, Equalizing Voltage Chart. Added 'Record readings on test data sheet, Table V.' to paragraph 3-15.                                  |                     |          |
| 3-10     | Added 'Record readings on test data sheet, Table V.' to paragraph 3-16e.                                                                           |                     |          |
| 3-11     | Added new paragraph 3-17f - 'Record readings on test data sheet, Table V.' Added procedures for 3.187 in. thick flywheel to paragraph 3-19a and b. |                     |          |
| 3-12     | Added 'Record readings on test data sheet, Table V.' to paragraphs 3-19c, 3-21, and 3-22. Added measurement location to paragraph 3-22.            |                     |          |
| 3-13     | Added Figure 3-3, Equalizing Voltage Chart (Series)                                                                                                |                     |          |
| 3-13     | Added Figure 3-4, Equalizing Voltage Chart (Shunt)                                                                                                 |                     |          |
| 3-15     | Added Table V, 200SGL Series Acceptance Test Data Sheet                                                                                            |                     |          |
|          |                                                                                                                                                    |                     |          |
|          |                                                                                                                                                    |                     |          |



## REVISIONS

| Page No.      | Description                                                                                                                                                                                                                                                                                              | Revision Date | Approved          |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------------|
| Entire Manual | Updated to reflect company name and contact information changes.                                                                                                                                                                                                                                         | 3/12/2010     | Approval on file. |
| II            | Updated manual Revision levels and statement at bottom of page.                                                                                                                                                                                                                                          |               |                   |
| III           | Changed title to "Service Bulletin Control" and revised list of Service Bulletins.<br>Added SB's:<br>SB 150SG128-1<br>SB 150SG151<br>SB 200SG140<br>SB 200SG141<br>SB 200SG146<br>SB 200SG156<br>SB 200SG157<br>SB 200SG158<br>SB 200SG159<br>Revised layout of table.                                   |               |                   |
| IV            | Changed title to "Service Letter Control" and revised list of Service Letters.<br>Added SL's:<br>165 (Incorporated)<br>168 (Incorporated)<br>173<br>188<br>191 (Incorporated)<br>192<br>194 (Incorporated)<br>199 (Incorporated)<br>208 (Incorporated)<br>210 (Incorporated)<br>Revised layout of table. |               |                   |
| V             | Added Airworthiness Limitations section.<br>Removed Additional Service Information section.                                                                                                                                                                                                              |               |                   |
| VII           | Added Figure 6-7A.                                                                                                                                                                                                                                                                                       |               |                   |
| VIII          | Added Table VI to manual.<br>Added Table VII to manual.                                                                                                                                                                                                                                                  |               |                   |
|               |                                                                                                                                                                                                                                                                                                          |               |                   |



## REVISIONS

| Page No.        | Description                                                                                                          | Revision Date         | Approved          |
|-----------------|----------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------|
| AL-1            | Added Airworthiness Limitations section.                                                                             | 3/12/2010<br>(cont'd) | Approval on file. |
| 1-1             | Added 1-2a and 1-2b, "Changes to Starter-Generator".                                                                 |                       |                   |
|                 | Changed to "...200SGL series starter generators".                                                                    |                       |                   |
| 2-1             | Added "...or suitable equivalent."                                                                                   |                       |                   |
| 2-3             | Added bearing pusher to Special Tools.                                                                               |                       |                   |
|                 | Added equivalency statement to Test Equipment table.                                                                 |                       |                   |
| 2-4             | Added "...or equivalent." in two places to 2-7 (a).                                                                  |                       |                   |
| 2-9             | Removed statement concerning sophisticated measuring equipment.                                                      |                       |                   |
| 2-10            | 2-12 (b): Changed "Magnaflux..." to "Magnetic particle test..."                                                      |                       |                   |
| 2-11            | 2-13 (b): Removed requirement for air gage and reference ring.                                                       |                       |                   |
|                 | 2-13 (c): Replaced "brush spring scale" with "standard spring scale".                                                |                       |                   |
|                 | 2-14A (a): Removed requirement to measure per 2-13 (a).                                                              |                       |                   |
| 2-13            | 2-19 (a) & (b): Replaced "capacitance bridge" with "capacitance tester".                                             |                       |                   |
| 2-16            | 2-23 (c): Replaced "Exacto knife blade" with "thin blade".                                                           |                       |                   |
| 2-20            | 2-24 (a): Replaced dimension 0.250 inches with 0.234 inches due to edge distance issues.                             |                       |                   |
| 2-27            | Removed proprietary statement from 1 <sup>st</sup> paragraph of note.                                                |                       |                   |
| 3-1             | Incorporated SL 208 by addition of 2 <sup>nd</sup> sentence in section 3-6.                                          |                       |                   |
| 3-9             | Added models to Table IV.                                                                                            |                       |                   |
|                 | 3-15: Changed last sentence to "...Tables V, VI, or VII as applicable".                                              |                       |                   |
| 3-17            | Added Table VI, Acceptance Test Procedure 200SGL1161-1 to cover models 200SGL132Q-3, 200SGL132Q-4, and 200SGL132Q-5. |                       |                   |
| 3-18            | Added Table VII. Acceptance Test Record 200SGL1161-2 to cover model 200SGL151Q.                                      |                       |                   |
| 4-2 through 4-6 | Added part numbers to reflect addition of new models in Section V Difference Data Sheets.                            |                       |                   |
| 4-8 and 4-9     | Added usage codes "V" through "AD" to reflect addition of new models in Section V Difference Data Sheets.            |                       |                   |



## REVISIONS

| Page No.      | Description                                                                                                                                                                                                   | Revision Date         | Approved          |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------|
| 4-13          | Removed footnote concerning SPS technologies and asterisk from table.                                                                                                                                         | 3/12/2010<br>(cont'd) | Approval on file. |
| 5-1           | Added model 200SGL132Q-3 (from SL 188)                                                                                                                                                                        |                       |                   |
| 5-2           | Added models:<br>200SGL131Q (from SL 191)<br>200SGL131Q-2 (from SL 191)<br>200SGL151Q (from SL 194)<br>200SGL132Q-4 (from SL 210)<br>200SGL147Q-2 (from SL 199)<br>200SGL147Q-3 (from SL 199)<br>200SGL132Q-5 |                       |                   |
| 6-9           | Added Figure 6-7A to cover model 200SGL132Q-5.                                                                                                                                                                |                       |                   |
| 7-5           | Added part numbers 200SGL1009-5 and 200SGL1009-10X2.                                                                                                                                                          |                       |                   |
| 8-1           | Added Service Bulletin section to manual.                                                                                                                                                                     |                       |                   |
| 9-1           | Added Service Letter section to manual.                                                                                                                                                                       |                       |                   |
| Entire Manual | Effectivity date of manual changed to June 8, 2010 under revision 9.1.<br>(Vertical change bars of revision 9 are retained for ease of review)                                                                | 6/8/10                | Approval on file. |
| III           | Added SB200SG156 Rev 'A' to Service Bulletin Control page.                                                                                                                                                    | 28 Feb., 2012         | Approval on file. |
| 8.1           | Added SB200SG156 Rev A to list.                                                                                                                                                                               |                       |                   |
| III           | Incorporated SB 200SG146 concerning "XL" type armatures into manual.                                                                                                                                          |                       |                   |
| IV            | Added Service Letters to control sheet:<br>SL 224, SL 225, SL 227, SL 230 & SL 238.                                                                                                                           |                       |                   |
| V             | Added "Reserved for Future Use" for section VII.                                                                                                                                                              |                       |                   |
| AL-1          | Incorporated SL 225 into main body of page.                                                                                                                                                                   |                       |                   |
| 2-12          | Removed note concerning XL brushes and Section VII.                                                                                                                                                           |                       |                   |
| 2-16          | Removed note concerning XL brushes and Section VII.                                                                                                                                                           |                       |                   |
| 3-5           | Removed note concerning XL brushes and Section VII.                                                                                                                                                           |                       |                   |
| 3-9           | Added models 200SGL129Q(3) & 200SGL132Q-2 to Table IV.                                                                                                                                                        |                       |                   |
| 4-1           | Added section G concerning nameplate p/n suffix letter "S".                                                                                                                                                   |                       |                   |
| 4-2           | Replaced SPS27FT-624 with 150SG1389-6.<br>Replaced SPS27FT-1032 with 150SG1389-3.                                                                                                                             |                       |                   |
| 4-3           | Removed brush p/n 200SGL1009-10.                                                                                                                                                                              |                       |                   |
| 4-4           | Bearing 200SGL1052-1-B superseded by 200SGL1052-7 per SL238.                                                                                                                                                  |                       |                   |
| 4-5           | Added nameplate 200SGL1092-25S.<br>Added nameplate 200SGL1092-56.<br>Added driveshaft 200SGL1103-19.                                                                                                          |                       |                   |
| 4-6           | Added modification status decal 400SG1380.<br>Added SAI-XL decal 200SGL1360S.<br>Added SAI-XL2 decal 200SGL1360-1S.                                                                                           |                       |                   |
| 4-7           | Replaced "4-20" with "4-21".<br>Added starter generator 200SGL129Q(3).                                                                                                                                        |                       |                   |
| 4-9           | Added usage code "AE" for 200SGL132Q-2.                                                                                                                                                                       |                       |                   |



## REVISIONS

| Page No. | Description                                                                                                                                                                                                                                                                   | Revision Date             | Approved          |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------|
| 4-10     | Bearing 200SGL1052-1-B superseded by 200SGL1052-7 per SL238.                                                                                                                                                                                                                  | 28 Feb., 2012<br>(cont'd) | Approval on file. |
| 4-11     | Added "...1301-3" to part number. Was "200SGL".                                                                                                                                                                                                                               |                           |                   |
| 4-13     | Added driveshaft assy 200SGL1103-19.                                                                                                                                                                                                                                          |                           |                   |
| 4-13     | Incorporated SL 227 as follows:<br>Item 4-1-26, replaced nut SPS27FT-624 with 150SG1389-6.<br>Item 4-2-26, replaced nut SPS27FT-624 with 150SG1389-6.<br>Item 4-1-28, replaced nut SPS27FT-1032 with 150SG1389-3.<br>Item 4-2-28, replaced nut SPS27FT-1032 with 150SG1389-3. |                           |                   |
| 4-15     | Added nameplate 200SGL1092-56.                                                                                                                                                                                                                                                |                           |                   |
| 4-16     | Added SAI-XL label 200SGL1360S.                                                                                                                                                                                                                                               |                           |                   |
| 4-16     | Added modification status decal 400SG1380.                                                                                                                                                                                                                                    |                           |                   |
| 4-16     | Updated armature assy portion of parts list.                                                                                                                                                                                                                                  |                           |                   |
| 4-16     | Incorporated information from SB 200SG146 by adding interchangeability note concerning armatures to bottom of parts list.                                                                                                                                                     |                           |                   |
| 4-16     | Added SAI-XL2 label 200SGL1360-1S.                                                                                                                                                                                                                                            |                           |                   |
| 4-16     | Included usage code "AD" for item 4-1-46.                                                                                                                                                                                                                                     |                           |                   |
| 4-19     | Incorporated SL 227 as follows:<br>Item 4-3-10, replaced nut SPS27FT-1032 with 150SG1389-3.                                                                                                                                                                                   |                           |                   |
| 4-19     | Updated usage codes for non-XL brush 200SGL1009.                                                                                                                                                                                                                              |                           |                   |
| 4-19     | Removed brush 200SGL1009-10. Reassigned its usage codes to brush 200SGL1009-10X2.                                                                                                                                                                                             |                           |                   |
| 4-19     | Added XL brush 200SGL1009-3.                                                                                                                                                                                                                                                  |                           |                   |
| 4-19     | Added usage code "P" to brush 200SGL1009-5.                                                                                                                                                                                                                                   |                           |                   |
| 4-19     | Added verification note to bottom of parts list.                                                                                                                                                                                                                              |                           |                   |
| 4-20     | Incorporated information from SB 200SG146 by adding interchangeability note concerning armatures to bottom of parts list.                                                                                                                                                     |                           |                   |
| 5-1      | Added 200SGL129Q(3) per SL 230.                                                                                                                                                                                                                                               |                           |                   |
| 5-1      | Added 200SGL132Q-2 per SL 224.                                                                                                                                                                                                                                                |                           |                   |
| 5-8      | Removed reference to 19-SB150SG116 and stamping "-1" after serial number.                                                                                                                                                                                                     | 19 August, 2013           | Approval on file. |
| 5-8      | Removed reference to 19-SB150SG117 and stamping modification decal.                                                                                                                                                                                                           |                           |                   |
| 5-16     | Removed reference to 19-SB150SG123 and requirement for modification decal.                                                                                                                                                                                                    |                           |                   |
| 5-20     | Removed reference to 19-SB150SG123 and requirement for modification decal.                                                                                                                                                                                                    |                           |                   |
| 5-28     | Replaced "shunt" with "series" and removed "...using a speed sensor and spur gear." from 2 <sup>nd</sup> paragraph.                                                                                                                                                           |                           |                   |
| 5-33     | Added Diff. Data Sheet for 200SGL129Q(3) per SL 230.                                                                                                                                                                                                                          |                           |                   |
| 7-1      | Removed materials affecting "XL" starter generators and incorporated into Section IV.                                                                                                                                                                                         |                           |                   |
| 8-1      | Added "(Reserved for future use)".                                                                                                                                                                                                                                            |                           |                   |
| 8-1      | Removed SB 200SG146 concerning armature interchangeability due to incorporation into manual.                                                                                                                                                                                  |                           |                   |
| Cover    | Added 200SGL153Q                                                                                                                                                                                                                                                              |                           |                   |
| IV       | Incorporated SL 231.                                                                                                                                                                                                                                                          |                           |                   |
| V        | Incorporated SL 229, SL 240, SL 242, SL 244.                                                                                                                                                                                                                                  |                           |                   |



## REVISIONS

| Page No.      | Description                                                                                                                                                                                                                                                                                                                                     | Revision Date               | Approved          |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------------|
| VIII          | Added "(200SGL119Q, 200SGL119Q-2, 200SGL131Q-5 & 200SGL153Q)".                                                                                                                                                                                                                                                                                  | 19 August, 2013<br>(cont'd) | Approval on file. |
| 2-29          | Added "(Ref. Section VI for 200SGL119Q, 200SGL119Q-2, 200SGL131Q-5 & 200SGL153Q)"                                                                                                                                                                                                                                                               |                             |                   |
| 3-9           | Added 200SGL153Q to Table IV.                                                                                                                                                                                                                                                                                                                   |                             |                   |
| 3-10          | Moved note from 3-17 to end of 3-16.                                                                                                                                                                                                                                                                                                            |                             |                   |
| 3-16          | Removed reference to ATP 200SGL1161-1 and changed title to "Acceptance Test Data Sheet".<br>Updated ATP paragraph references.<br>Revised from 600V to 250V dielectric strength test.                                                                                                                                                            |                             |                   |
| 3-17          | Removed reference to ATP 200SGL1161-2 and changed title to "Acceptance Test Data Sheet".<br>Updated ATP paragraph references.<br>Revised from 600V to 250V dielectric strength test.                                                                                                                                                            |                             |                   |
| 4-1           | Added 200SGL153Q, usage code "AF".                                                                                                                                                                                                                                                                                                              |                             |                   |
| 4-1 thru 4-23 | Applied usage code "AF" to parts list as needed.                                                                                                                                                                                                                                                                                                |                             |                   |
| 4-9           | Added usage code "W" to 200SGL1040-2.                                                                                                                                                                                                                                                                                                           |                             |                   |
| 4-10          | Incorporated SL242 by replacing bearing p/n 150SG1052-B with 150SG1052-14.<br>Added usage code "W" to 150SG1052-14.                                                                                                                                                                                                                             |                             |                   |
| 4-11          | Added usage code "W" to 200SGL1301-2.<br>Added usage code "W" to MS35489-1.                                                                                                                                                                                                                                                                     |                             |                   |
| 4-12          | Reviewed/updated usage codes for spur gear 200SGL1219-1.                                                                                                                                                                                                                                                                                        |                             |                   |
| 4-13          | Added usage code "W" to 200SGL1156-5.<br>Added usage code "W" to 200SGL1318.<br>Added usage codes "W" and "AD" to NAS1189-06P12B.<br>Added usage code "W" to AN960C616.<br>Added usage code "W" to AN960C10.                                                                                                                                    |                             |                   |
| 4-14          | Added XL nameplate 200SGL1092-38.<br>Reviewed/updated usage codes for mag. pickup 300SG1222-2.<br>Added screw MS35266-59 and clamp 400SG1237.<br>Added usage code "W" to MS35265-65.<br>Added usage code "W" to MS35338-43.<br>Added usage code "W" to AN960-10L.<br>Added usage code "W" to MS3112E8-3P.<br>Added usage code "W" to 200SG1221. |                             |                   |
| 4-15          | Removed XL label p/n 200SGL1360 per SL 244.                                                                                                                                                                                                                                                                                                     |                             |                   |
| 4-16          | Added usage code "W" to 200SGL1107.                                                                                                                                                                                                                                                                                                             |                             |                   |
| 4-17          | Removed p/n 200SGL1093 for qty 3.<br>Added usage codes "G", "P", and "AF" to 250SG1093.                                                                                                                                                                                                                                                         |                             |                   |
| 4-18          | Added usage code "W" to 250SG1116.<br>Added usage code "V" and "AC" to item 4-3-.                                                                                                                                                                                                                                                               |                             |                   |
| 4-19          | Added brush p/n 200SGL1009-7.<br>Incorporated SL240 by adding usage code "P" to 200SGL1009-3 and removing from 200SGL1009-5; added usage code "Q" to 200SGL1009 per SL240.<br>Added usage codes "V" and "AC" to item 4-3-1.                                                                                                                     |                             |                   |
| 5-1           | Added 200SGL153Q.                                                                                                                                                                                                                                                                                                                               |                             |                   |
| 5-17          | Added "(See Section VI for Belleville spring instructions)".                                                                                                                                                                                                                                                                                    |                             |                   |



## REVISIONS

| Page No. | Description                                                                                                                           | Revision Date               | Approved          |
|----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------------|
| 5-23     | Added "Except: Use Table VI from Section III for Acceptance Test Data Sheet."<br>Removed note from bottom of page.                    | 19 August, 2013<br>(cont'd) | Approval on file. |
| 5-28     | Removed "Except: Radial vibration per 200SGL1161-1."<br>Added "Except: Use Table VI from Section III for Acceptance Test Data Sheet." |                             |                   |
| 5-31     | Removed reference to 200SGL1161-1.<br>Replaced with, "Use Acceptance Test Data Sheet..."                                              |                             |                   |
| 5-35     | Added Difference Data Sheet for 200SGL153Q.                                                                                           |                             |                   |
| 6-1      | Added "(200SGL119Q, 200SGL119Q-2, 200SGL131Q-5 & 200SGL153Q)".                                                                        |                             |                   |
| 6-10     | Added 200SGL153Q.                                                                                                                     |                             |                   |



## AL-1 AIRWORTHINESS LIMITATIONS

The Airworthiness Limitations section is FAA approved and specifies maintenance required under 14 CFR §§ 43.16 and 91.403, unless an alternative program has been FAA approved.

There are no airworthiness limitations for this series of starter generators.

## AL-2 RECOMMENDED OVERHAUL PERIOD

Unless established otherwise in the aircraft operator's own Airworthiness Limitations or Operating Specifications, the recommended overhaul period for SAI starter-generators is 1,000 hours with a minimum of 1 brush change prior.

## AL-3 FIELD SERVICING LIMITS

Recommended field service on starter-generator units is limited to brush inspection only. All other repair and/or overhaul activity should be carried out by an authorized repair station.

Except for brush inspections, aircraft airworthiness is accomplished through removal and replacement of the starter-generator.

### NOTE

**Consult the Service Letters section of this manual for information on brush life calculations.**

## AL-4 START CYCLES

After every start cycle, the starter-generator as well as the engine should have the opportunity to cool off. The minimum cooling times are stated below:

30 seconds ON – 1 minute OFF  
30 seconds ON – 1 minute OFF  
30 seconds ON – 30 minutes OFF

## AL-5 STORAGE LIMITS

If the starter-generator has been in storage for longer than 24 months, it should not be installed on an aircraft. It must be returned to an SAI authorized repair facility for testing and, if necessary, repair.

Bearing grease shelf life is 5 years from date of manufacture of the bearing.



Skurka Aerospace Inc.  
4600 Calle Bolero, P. O. Box 2869  
Camarillo, CA 93011

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## SECTION I

### INTRODUCTION

#### 1-1 GENERAL

- 1-2 This manual contains maintenance instructions, test procedure and illustrated parts breakdown for type 200SGL SERIES DC starter-generator. This unit is manufactured by:

Skurka Aerospace Inc.  
4600 Calle Bolero  
P.O. Box 2869,  
Camarillo, CA 93011.  
[www.skurka-aero.com](http://www.skurka-aero.com)

#### NOTE

**If an error, omission, or other discrepancy is found in this manual, please fill out a copy of the Technical Documentation Suggestion Form found at the back of this manual and send to Technical Department at SAI.**

#### 1-2a CHANGES TO STARTER-GENERATOR

- 1-2b Changes to the starter-generator are communicated and distributed by revision to the Component Maintenance Manual, and by Service Bulletins (SB) or Service Letters (SL). SB's and SL's may be incorporated at the next revision change when applicable. Active or valid service information pertinent to this manual is located in the appropriate sections of the manual.

Notice of changes to manuals and service information are distributed via e-mail to active subscribers. The latest revision level of technical manuals and associated service information are accessible online at <http://www.apc-ai2.com/>.

#### 1-3 PURPOSE OF EQUIPMENT

- 1-4 The Starter-Generator is used as an engine-driven source of DC power in a 28 volt aircraft electrical system and as a source of starting power for light-weight turbine engines. An efficient integral fan draws air in at anti-drive end of generator to permit self-cooled operation.

#### 1-5 LEADING PARTICULARS

- 1-6 The leading particulars of the Starter-Generator are given in Table I.
- 1-7 Section II of this manual contains maintenance instructions for 200SGL series starter generators. Test procedure is covered in Section III. Section IV contains an Illustrated Parts Breakdown. Section V and VI lists Difference Data Sheets.



**TABLE I LEADING PARTICULARS**

**D-C Output**

|               |     |
|---------------|-----|
| Volts.....    | 30  |
| Amperes ..... | 200 |

**Speed Range**

|                                        |             |
|----------------------------------------|-------------|
| Speed Range.....                       |             |
| Continuous Operating Speed (rpm) ..... | 12,000      |
| Minimum rated Speed (rpm) .....        | 7,050       |
| Overspeed (rpm).....                   | 14,000      |
| Cooling .....                          | Self-Cooled |
| Rotation (Viewed from Drive end) ..... | CCW         |

**Spline Data**

|                       |                                    |
|-----------------------|------------------------------------|
| Teeth .....           | 12                                 |
| Pitch.....            | 20 / 40                            |
| Pressure Angle .....  | 30 degrees                         |
| Mounting Flange ..... | Quick-Attach-Detach (QAD) MS3331-1 |

**Overall Dimensions**

|                       |      |
|-----------------------|------|
| Diameter (max.) ..... | 5.25 |
| Length (max.) .....   | 8.90 |

**External Starting Power**

|                 |           |
|-----------------|-----------|
| Volts, DC ..... | 28.0 Max. |
| Amperes .....   | 1000 Max. |



## SECTION II

### MAINTENANCE INSTRUCTIONS

#### 2-1 SPECIAL TOOLS

2-2 Special tools and test equipment are listed in Table II.

#### 2-3 DISASSEMBLY

#### 2-4 GENERAL

- a. Disassemble the starter-generator as shown in parts list (Figure 4-1 through 4-3).
- b. Retaining ring, O-ring, lock washers, flat washers, screws, and self locking nuts must be discarded whenever removed. Replace with new hardware.

#### 2-5 MAIN ASSEMBLY (Refer to IPL Figure 4-1 & 4-2).

- a. Remove fan cover. (52) Lift up brush springs (2) (Figure 4-3) and remove and discard brushes (11)
- b. Hold the drive end of drive shaft assembly (7) using a spline wrench or suitable equivalent. Remove lock nut (47), springs (46) and fan (45). Remove the drive shaft assembly.
- c. Remove back damper plate (9) using gear puller, taking care to prevent damage to end of armature shaft by gear puller.
- d. Remove four screws (36) and carefully lift connector (33) from spacer (34). Unsolder lead wire from connector pins and remove connector and spacer from stator housing assembly.
- e. Remove eight screws (15) and washers (16), (17). Remove drive end bell (10).



- f. Remove eight screws (49), lock washers (50) and washers (51).  
Remove commutator end bell assembly (48) with assembled armature. Press out armature (44) using a suitable pusher to protect armature shaft end.
- g. Using a bearing puller, remove ball bearing (6) from generator armature. Remove four screws (43). Remove bearing retainer (41). Press ball bearing out of commutator head (48). Do not disassemble commutator head unless necessary.
- h. Do not disassemble stator assy. To remove terminal block (20), remove nuts (26) (28) and washers (27) (29) from terminal block, remove screws (30) and washers (31) (32). Then remove terminal block.



TABLE II

**SPECIAL TOOLS**

| <b><u>Part Number</u></b> | <b><u>Nomenclature</u></b>       | <b><u>Application</u></b>                               |
|---------------------------|----------------------------------|---------------------------------------------------------|
| T150SG1073-1              | Tool, Damper Plate<br>(Fig. 2-7) | Position armature<br>damper plate on<br>armature shaft. |
|                           | Bearing Pusher<br>(Fig. 2-8)     | Bearing installation.                                   |

**TEST EQUIPMENT**

(Equivalent substitutes may be used for items listed)

| <b><u>Part Number</u></b> | <b><u>Nomenclature</u></b>                | <b><u>Application</u></b>                     |
|---------------------------|-------------------------------------------|-----------------------------------------------|
| GE9069199G                | Growler                                   | To test intercoil shorts<br>in armatures      |
|                           | Hi- Pot Tester                            | To test for shorts in<br>electrical wiring.   |
|                           | Double Bridge                             | For measuring resistance<br>of various coils. |
|                           | Sprague TelOhmike<br>Model TO-GA or equal | Testing of capacitors                         |
|                           | Dynamic Balancer                          | For checking armature<br>balance.             |



## 2-6 CLEANING

## 2-7 GENERAL

- a. For oily parts, use Stoddard Solvent or Mineral Spirits or equivalent. For non-oily parts, use isopropyl alcohol and 50 percent water or equivalent. Dip a stiff non-wire brush in the solvent and scrub the parts thoroughly. Do not soak parts in the solvent for extended length of time.

Steam cleaning using a detergent that does not conduct electricity is also recommended. After cleaning with detergent, rinse parts with clean steam (no detergent). Bake the armature and stator at 250° F, for six hours.

### **WARNING**

**When using cleaning solvents, take precaution to avoid burning skin or inhaling fumes. Use solvent in a well-Ventilated room only.**

### **CAUTION**

**Solvents or cleaning methods other than those described above, are not recommended since their use may damage the insulating varnish used in this equipment.**



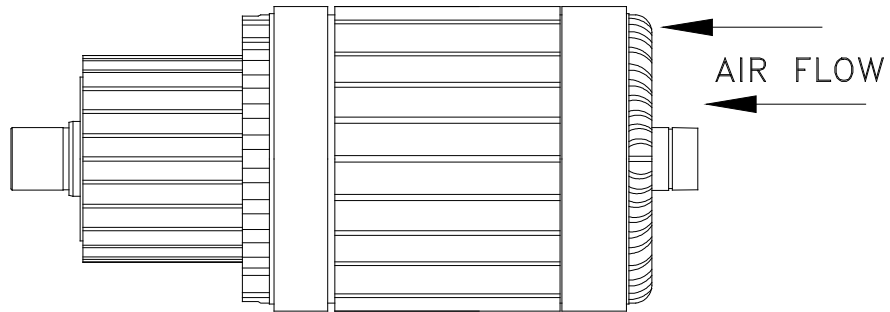
- b. Ultrasonic cleaning equipment may be used. However, consult the manufacturer of this equipment for the proper cleaning solutions and methods to be used.

## 2-8 **ARMATURE AND STATOR** (Refer to IPL Figure 4-1)

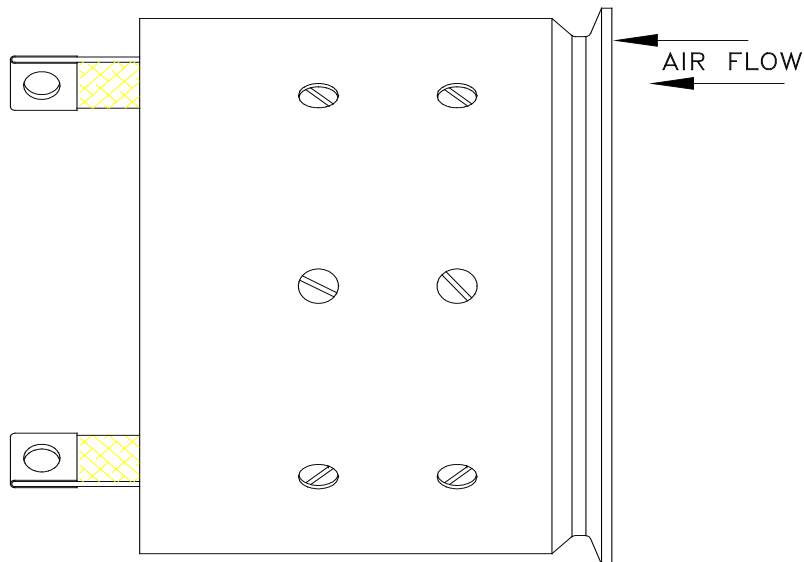
- a. Using a stiff non-wire brush, clean the armature (44) and stator (19). Be sure that all carbon and copper particles are removed from the area between the commutator bars of the armature. Wash the windings of the stator to remove carbon particles. When using air to blow cleaning fluids and dirt from armature, blow air in direction as shown in Figure 2-1. When using air to blow cleaning fluids from stator, blow air from drive end side toward commutator end of stator as shown in Figure 2-2.
- b. After cleaning, bake armature and stator in an oven for three hours at 93 degrees C (200 degrees F).
- c. Apply a light film of oil or anti-corrosion compound to all bare steel metal surfaces such as bearing liners, armature drive shafts, and damper faces to prevent rusting, if storing for a length of time.

**CAUTION**

**Do not apply oil to the commutator  
or electrical wires or coils.**



**Figure 2-1**  
**Cleaning of Armature**



**Figure 2-2**  
**Cleaning of Stator**



## 2-9 INSPECTION

### 2-10 GENERAL

- a. Inspect all parts and wiring for wear and damage. Refer to Table III for wear inspection measurements.
- b. Replace all worn or damaged parts except where a repair procedure is given.

### 2-11 ARMATURE (Refer to IPL Figure 4-1)

- a. Examine the armature (44) for wear and damage. Replace the armature if the bearing journals are worn beyond the minimum dimensions specified in Table III.
- b. Check the bands of the armature for firmness and tightness. Check the commutator for loose or misaligned bars. Measure the depth of undercut between commutator bars. The depth should not be less than .032 inch. If so, cut the slot to a depth of .045. Inspect the brush contact surfaces of commutator, which should be even, highly burnished and copper in color. If brush contact surfaces are rough, pitted, scored, burned, or have a film of carbon or oil that cleaning will not remove, turn down the commutator and undercut as instructed in paragraph 2-23. (It is recommended the commutator be refinished each time brushes are changed.)



**NOTE**

**Badly burned commutator bars are usually the result of:**

- open or shorted armature coils
- undersize brushes
- brushes too tight in brush boxes
- loose brush terminal screws
- operating generator in starter mode for too long a time.
- hung brush

All of the above will cause brush and commutator overheating.

- c. Inspect the armature windings for burned, cracked, or frayed insulation. Check to see all conductors are firmly brazed to commutator risers.
- d. Closely examine the splines inside the armature shaft for wear. The degree of spline wear may be determined by visual comparison with a new spline. Replace the armature if a new drive shaft shows excessive radial play when inserted in the armature.



TABLE III

WEAR INSPECTION MEASUREMENTS

| <u>See Figure 4-1</u>   | <u>Checkpoint</u>            | <u>Dimensions/Inches</u> |            |
|-------------------------|------------------------------|--------------------------|------------|
|                         |                              | <u>Min</u>               | <u>Max</u> |
| Armature (44)           | Armature Bearing Journals OD | 0.6692                   | 0.6695     |
| Drive End Bell (10)     | Bearing Liner ID             | 1.5747                   | 1.5750     |
| Commutator Housing (48) | Housing Bore ID              | 1.5747                   | 1.5750     |
| Armature (44)           | Commutator OD                | 1.9600                   | -----      |

NOTE

Plating or rework of Drive End or Commutator End housing bearing liners is not recommended.

This procedure can lead to premature bearing failures.



**2-12 DRIVE SHAFT ASSEMBLY** (Refer to IPL Figure 4-1)

- a. Check the drive shaft assembly splines (7) for wear. Large 12 tooth splines should measure .696 inches minimum over two .0864 inch diameter pins. The small 11 tooth spline is checked for wear by installing it in the armature and a new drive shaft into the same armature, and then comparing both for radial play. Discard the used shaft for excess radial play.
- b. Magnetic particle test the drive shaft per ASTM-E1444 for cracks, in particular the shear point. Discard the shaft if a crack is noted.
- c. When inspecting for evidence of overheating, bear in mind that although discoloration may indicate a weakened shaft, the condition can also be present in a sound shaft. Uniform discoloration along the pencil section of a new shaft may be disregarded. However, if localized or blotchy discoloration is noted, overheating in service is indicated. This shaft should be replaced. If slight bluing has occurred, the shaft may still be serviceable provided a magnetic particular inspection reveals no surface cracks. If black discoloration is present, discard the drive shaft assembly. Steps should be taken also to eliminate the cause of the condition, such as, overload or excessive vibration.

**2-13 COMMUTATOR, END BELL ASSEMBLY**  
(Refer to IPL Figure 4-3.)

- a. Inspect the parts of the commutator end bell assembly for wear and damage. Be sure that brush holder assemblies (1) are not bent, distorted, or loose.



- b. Check bearing liner for wear and damage. If bearing liner inside diameter is worn beyond permissible dimensions specified in Table III, replace the commutator head.
- c. Using a standard spring scale with a small loop of wire, measure the tension of all brush springs, lifting the spring a maximum of 1/64 of an inch, off a new brush which is flush with the bottom of brush box. Tension should be between 30-45 ounces.

**2-14 STATOR** (Refer to IPL Figure 4-1 and 4-2)

- a. Inspect the stator (19) for wear and damage. Check for damaged insulation and loose or broken terminals. Check for tightness of coils visible brazed joints, and tightness of welded screens. Screens should not rest on stator coils.

**2-14A DRIVE END BELL** (Refer to IPL Figure 4-1)

- a. Measure the bearing liner in Drive End Bell (10). Replace end bell if liner is worn beyond those dimensions shown in Table III.

**2-15 TESTING**

**2-16 ARMATURE** (Refer to IPL Figure 4-1)

- a. After cleaning and baking armature (44) per paragraph 2-8 and using a Hi-Pot insulation tester, ground test armature. Apply 300 volts AC, 60 Hz for 1 second between a commutator bar and the shaft (ground) and between the two stainless steel bands and the commutator. Replace the armature if it is grounded, unless steam cleaning and baking for five hours at 250° F will reduce the short to within the limits stated above..



**WARNING**

**When making electrical checks,  
take precaution to avoid touching conductors  
carrying high voltages. Make sure the  
test probes are well insulated.**

**CAUTION**

**Keep the test probe outside the  
Commutator brush path to avoid  
damaging the contact surface.**

- b. Test for a short or open circuit by placing the armature in a growler. Holding a thin strip of steel (such as a hacksaw blade) over the armature core, slowly rotate the armature by hand. If the steel strip vibrates, replace the armature.

**2-17 STATOR** (Refer to IPL Figure 4-1)

- a. After removing terminal block (20), using a Hi-Pot insulation tester, ground test the stator (19). Apply 300 volts AC at commercial frequency (60 Hz) for one second between any winding and the stator housing (ground). Replace the stator if the insulation breaks down.
- b. Using a double bridge GE Model 9069199G, or equivalent device, measure shunt field (terminals A to D). The resistance of the shunt field should be between 1.75 and 2.00 ohms at a temperature of 25 degrees C (77 degrees F). If the resistances are outside the permissible range, replace the stator.



2-18 **COMMUTATOR HEAD** (Refer to IPL 4-1)

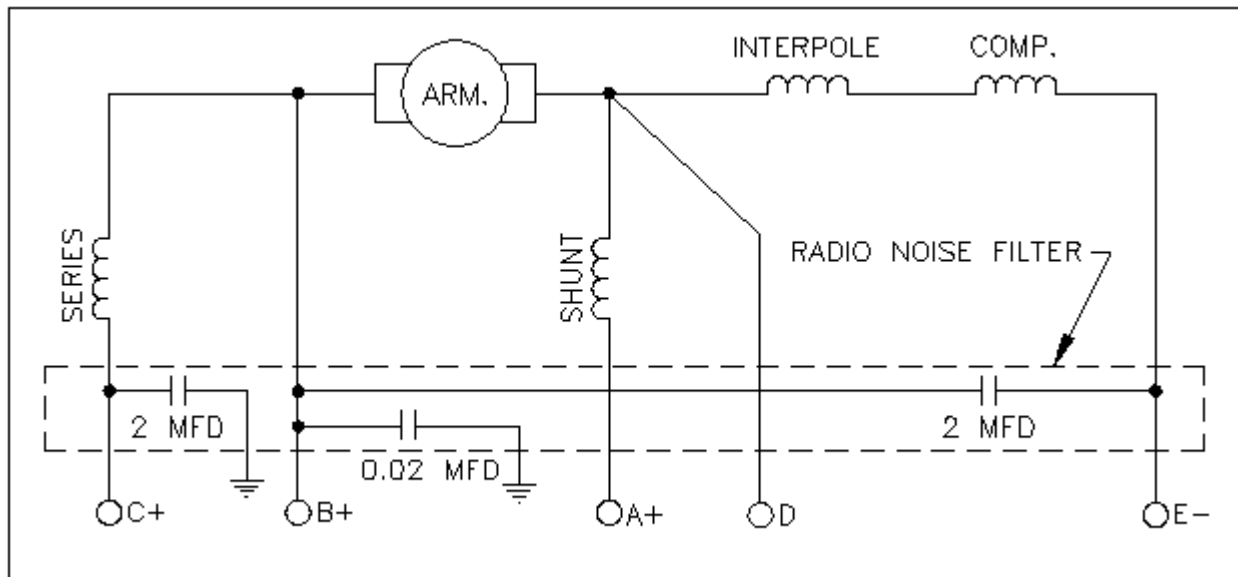
- a. Test the commutator head (48) for grounds and shorts, using Hi-Pot tester described in Table II. Check for shorts between the end bell casting and brush holders. Apply 300 volts AC at commercial frequency (60 Hz) for one second. If ground is indicated, disassemble the end bell to repair the short. (See paragraph 2-28)

**CAUTION**

**Do not test across adjacent brush holders as capacitors wired across the holders will be damaged**

2-19 **CAPACITORS AND TERMINAL BLOCK** (Refer to IPL 4-1)

- a. Using a capacitance tester, measure the capacitance of the capacitors in the terminal block (20). The capacitance must measure as indicated in TERMINAL BLOCK AND GENERATOR WIRING DIAGRAM Figure 2-3.
- b. Using a capacitance tester, measure the capacitance of the capacitors in the commutator head P.C boards. Capacitance should measure .33 MFD  $\pm$  10%



**NOTE: CAPACITOR TOLERANCES**  
**2 MFD CAPACITORS  $\pm 10\%$**   
**0.02 MFD CAPACITORS  $\pm 20\%$**

**Figure 2-3**  
**Terminal Block & Generator Wiring Diagram**



## 2-20 REPAIR OR REPLACEMENT

### 2-21 GENERAL

- a. Replace all worn or damaged parts except where a repair procedure is given.
- b. Replace all brushes (11) (Figure 4-3) at each overhaul. New brushes must be run-in for proper seating. (Refer to paragraph 3-10.)
- c. Replace ball bearings (6) (Figure 4-1) at each overhaul.
- d. Replace damper springs (Figure 4-1) (46) and nut (47) at each overhaul. Also replace friction ring (8) at each overhaul. This is important for proper operation of drive shaft damper assembly.

### 2-22 ARMATURE

- a. Replace the armature (44) (IPL Figure 4-1) if any of the following conditions exist:
  - 1. If the bearing journals diameter are not within .6692-.6695 inches (See Table III).
  - 2. If the commutator bars are badly burned and cannot be repaired by cutting on a lathe. (See paragraph 2-11)
  - 3. If the commutator bars are loose or out of alignment.
  - 4. If turning down the commutator would reduce the outside diameter below the allowable minimum of 1.960 inches.



## 2-23 RESURFACING THE COMMUTATOR

- a. At each overhaul, cut the commutator to remove wear marks, oil or carbon film. Take a single light cut at a speed of approximately 600 surface feet per minute. If the surface is scored or pitted, take a series of light cuts at a speed of approximately 200 surface feet per minute. A diamond tipped cutting tool is recommended. (See Figure 2-4.) The point of the cutting tool must be held on the centerline of the armature shaft. (See Figure 2-6). If a carboloy-tipped commutator cutting tool (See Figure 2-5) is used, the point of the cutting tool must be held 1/32 inch below the center line of the armature shaft. The minimum diameter to which the commutator may be turned down is 1.960 inches.
- b. After the commutator is turned down, measure the depth of the under-cutting between commutator bars. If the depth is less than .032 inches, undercut the mica to .045 inches deep maximum and to a width of .030-.035.
- c. After the commutator is undercut, take a final cut of not more than 0.001 inches across the face of the commutator to remove burrs. If a diamond-tipped commutator cutting tool is not available, make the final cut with a freshly honed carboloy-tipped commutator cutting tool. The cutting speed should be 600 surface feet per minute with either type cutting tool. Do not use polishing abrasives. After the final cut, remove burrs between commutator bars with a strip of fiber or a thin blade.
- d. The commutator should be concentric with bearing surfaces of the armature shaft within a 0.0005 inch full indicator reading. Bar to bar concentricity should be within .0002.

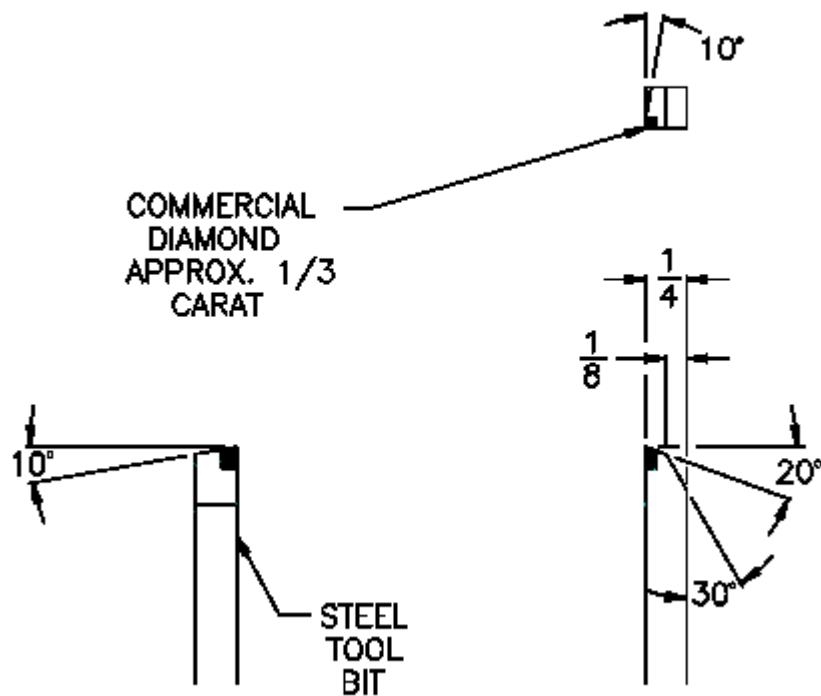
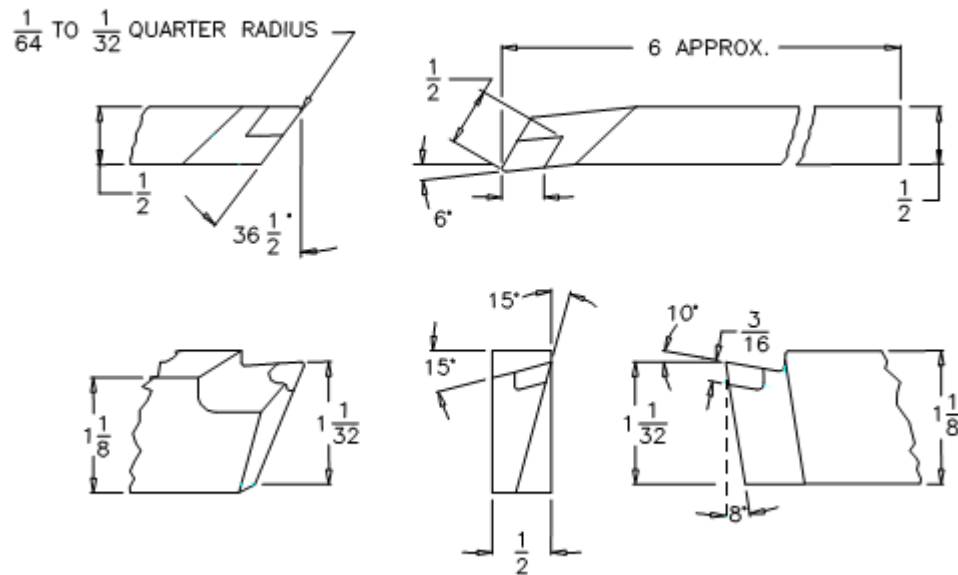


Figure 2-4  
Typical Diamond-Tipped Commutator Cutting Tool

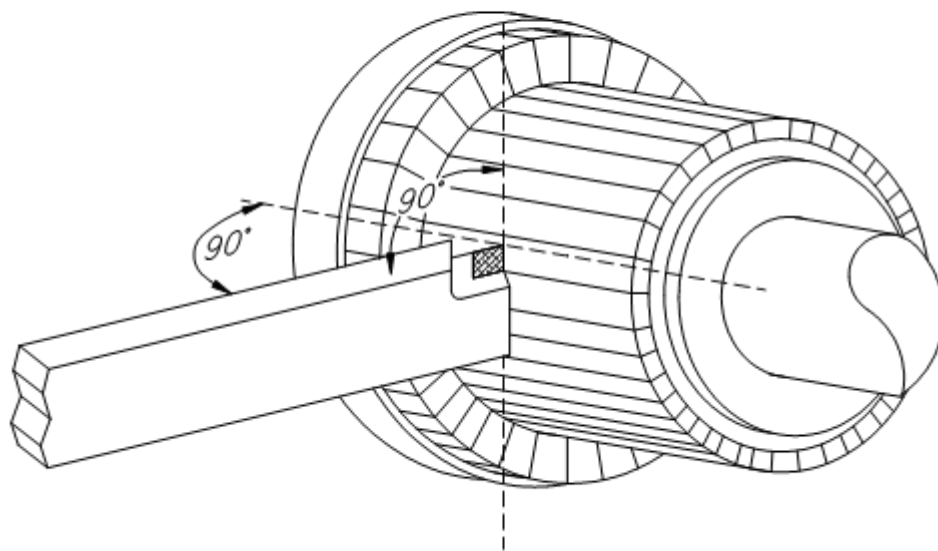


**Figure 2-5**  
**Typical Carboly-Tipped Commutator Cutting Tool**



Skurka Aerospace Inc.  
4600 Calle Bolero, P. O. Box 2869  
Camarillo, CA 93011

---



**Figure 2-6**  
**Mounting of Commutator Cutting Tool**



## 2-24 REBALANCE OF ARMATURE

- a. Using a dynamic balance machine, check the armature for static and dynamic balance. The armature should not be out of balance by more than 5 grain inches. If balance is required, mill the stainless steel bands at either end of armature to a maximum of 0.031 inch deep max. and 0.234 inch wide cuts, until proper balance is obtained. Only two 0.234 inch wide cuts are permitted in each band to maintain band strength.

## 2-25 COMMUTATOR END BELL, BEARING LINER AND DRIVE END BELL BEARING LINER (Refer to Figure 4-1)

- a. If the commutator end bell bearing liner (48) or the drive end mounting flange bearing liner (10) are worn beyond 1.5747 to 1.5750 inches, replace the commutator end bell or drive end bell. Replating of the bearing liner is not recommended.

## 2-26 REASSEMBLY

## 2-27 GENERAL

- a. Reassembly is basically the reverse of disassembly.
- b. Follow the exploded views (Figures 4-1 through 4-3), disassembly paragraph 2-3 through 2-5 and the schematic wiring diagram (Figure 2-9) for reassembly information.
- c. Special procedures and tool applications are covered in paragraph 2-29.

## 2-28 COMMUTATOR END BELL ASSEMBLY (Refer to Figure 4-3)

- a. Place end bell (48) (Figure 4-1) in a suitable holding fixture.



**NOTE:**

**Coat insulating tubes, non-metallic washers  
and metallic washers prior to installation with red  
insulator No. ER-41 and thinner T-200X  
(John C. Dolph Co., Monmouth Junction, NJ)  
Allow to dry for 30 minutes.**

- b. Install two brush springs Figure 4-3) (2) on brush holder (1). Each spring must be wound approximately 3/4 turn before installation on brush holder spring support bar.

**CAUTION**

**Do not over wind spring. Overwinding  
spring will cause spring to take a permanent  
set and produce insufficient pressure.**

- c. Install insulating tubes (7), non-metallic washers (8) & (9), metal washers (6), and lock nut (10) on the brush box mounting screw (5) in proper order. Position printed circuit board assembly (3) across to adjacent brush holders (1).
- d. Using a wrench, tighten nut (10) until snug. Torque Nut to 25-30 in. Lbs.
- e. Coat area between nut (10) and screw(5) with ER/41 or insulating paint to prevent entry of carbon dust under washers and brush box mounting ears. This will prevent shorting to ground of brush boxes. Bake end bell at maximum 150 degrees F (66 degrees C) for one hour.



2-29 **MAIN ASSEMBLY** (Refer to IPL Figure 4-1)

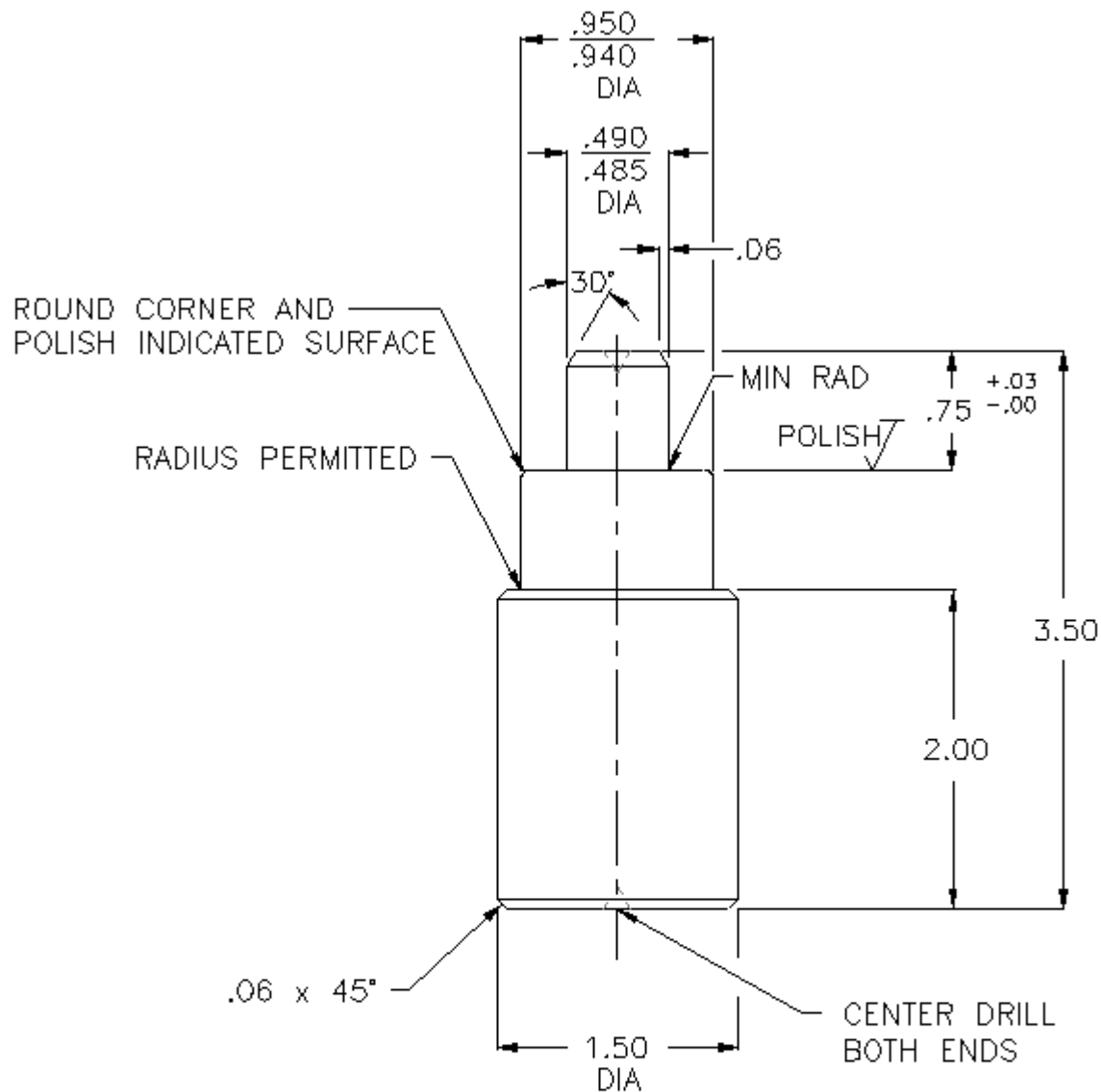
- a. Mount disc baffle (5) with protruding surface facing bearing (6) on the drive end of generator armature (44). Mount bearing on same end of armature shaft using an aluminum block or suitable fixture to support armature shaft on opposite end. Press on bearing by pushing the inner race with a suitable bearing pusher. See Fig. 2-8.
- b. Press bearing (6) into bell assy, commutator end (48), using a suitable bearing pusher against the outer race.
- c. Support armature in arbor press on an aluminum block or suitable fixture. Position commutator end bell with bearing previously installed over the armature shaft. Press commutator end bell assy and bearing (48) on to armature shaft by pushing inner race of bearing with suitable pusher. Apply anti-seize compound part number 150SG1309 to four screws (43). Secure bearing in end bell with bearing retainer (41) using four screws (43), and lock washers(42).
- d. Position armature with assembled commutator end bell on stator assy (19). Stator should be mounted on a suitable fixture to allow armature shaft to project through opposite end of generator. Apply anti-seize compound part number 150SG1309 to threads of eight screws (49). Install eight lock washers (50) and eight plain washers (51) on screws. Insert screws and tighten.
- e. Apply a continuous film of Never-Seize Anti-Seize compound to the bearing liner of the drive end bell assembly (10), then position the drive end bell assembly over drive end bearing. Insure that the bell is fully seated against stator housing. Apply anti-seize compound part number 150SG1309 to threads of screws (15). Place lock washers (16) and plain washers (17) on screws. Install eight screws (15).



- f. Install remaining disc baffle (5) on shaft with protruding surface facing bearing. Install retaining ring (4) in groove in armature shaft. Make sure retaining ring is fully seated in groove.
- g. Install terminal block (20) as follows:  
Position terminal block (20) on stator (19) with stator leads positioned on terminal block studs and install two screws (30), lock washer (31) and flat washers (32). Tighten screws. Install washers (27) (29) and nuts (26) (28) on terminal block.
- h. Place damper plate (9) on armature shaft by hand. Make sure damper plate is squarely seated on taper.

**CAUTION**

**Do not hammer damper plate on shaft or use arbor press to force on the damper plate.**

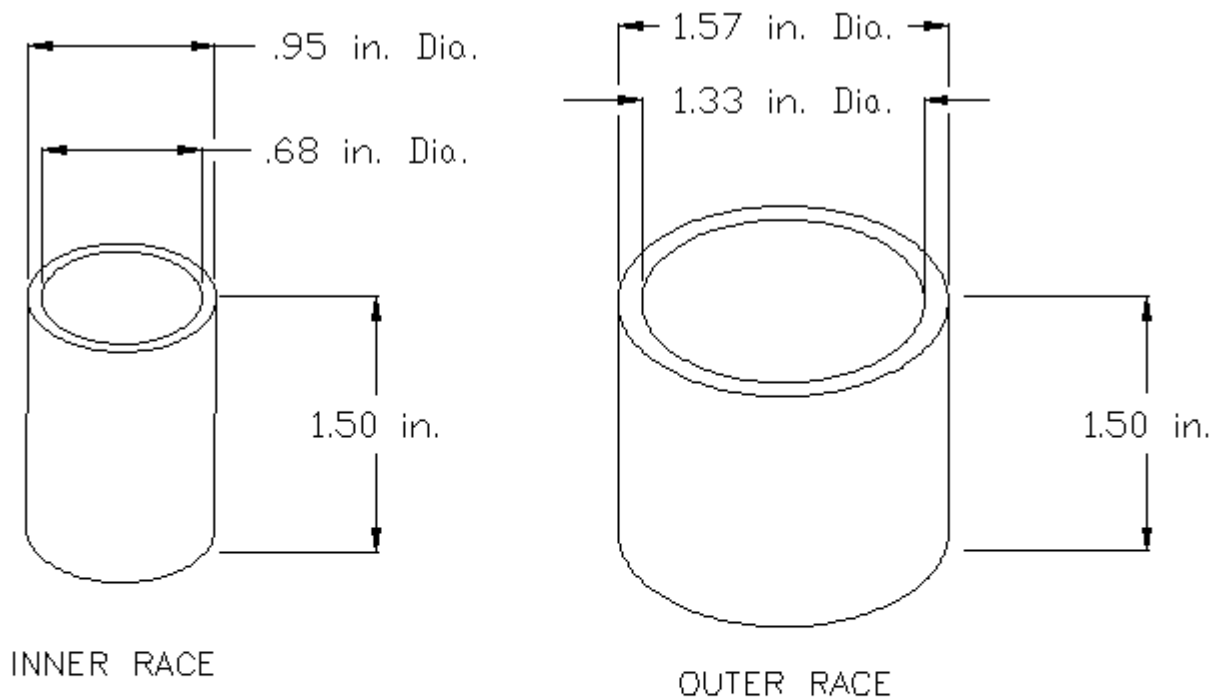


MATERIAL: 4340 STEEL  
HEAT TREAT TO RC 48-52

T150SG1073-1  
DAMPER PLATE  
INSTALLATION TOOL

**Figure 2-7**

**Damper Plate Installation Tool (T150SG1073-1)**



MATERIAL: 4340 STEEL  
HEAT TREAT TO RC 48-52  
TOLERANCE: DECIMALS .XX  $\pm 0.01$

**Figure 2-8**  
**Bearing Pusher (Inner Race and Outer Race)**



- i. Press armature damper plate (9) into position on the armature shaft using a hand arbor press and installation tool T150SG1073-1. (See Figure 2-7) Place the generator drive end up on an aluminum block under the ram of the arbor press. Place tool T150SG1073-1 over the armature drive shaft resting on the damper plate (9). Using the arbor press, gently press tool T150SG1073-1 until the tool bottoms against the end of the armature shaft and positions the armature damper plate. The damper plate should be square and tight on the armature. If not tight, replace the armature shaft damper plate (9).
- j. Coat the small spline of the drive shaft assembly (7) with Lubriplate 630-AA or equal.
- k. Place a new friction ring (8) on drive shaft (7). Push shaft into armature (44) making contact with plate on armature shaft (7).
- l. Position the fan (45) on back end of the drive shaft. Install two each new Belleville tension springs (46) per drawing (Figure 2-10). With suitable holding tool, hold drive shaft and install nut (47) and gently tighten until the nut and springs bottom gently against the fan. Then, back off the nut, 3/4 of a turn. Drive shaft should be tight against damper plate (9).

**CAUTION**

**When bottoming the nut, do not  
overtighten or damper springs will be  
damaged.**



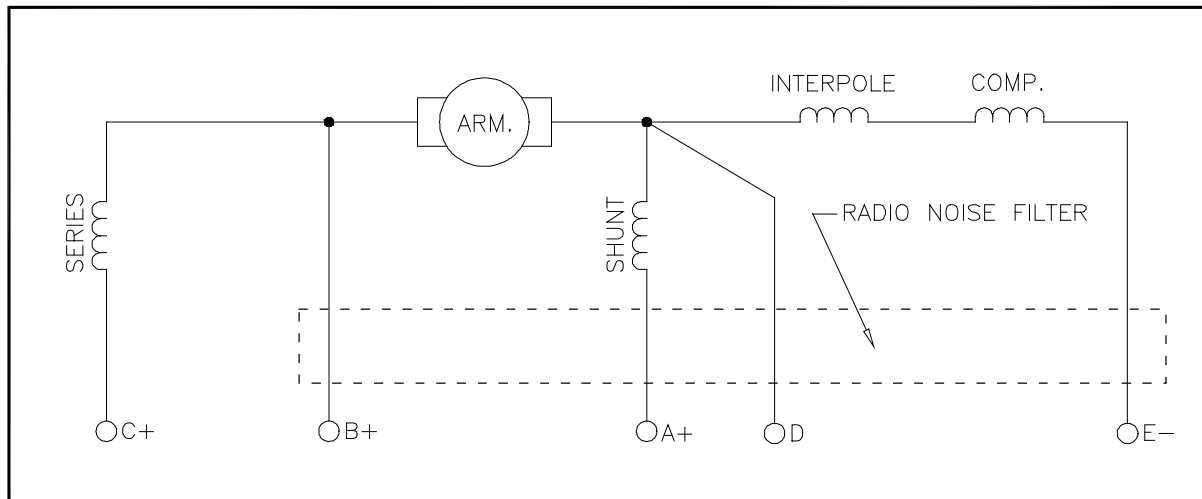
- m. Install four brushes (11) (IPL Figure 4-3) securing brush leads with screws (12). See Figure 2-11 for correct positioning of brush leads to prevent brush hang-up on the brush box.
- n. Install fan cover (52) (Figure 4-1) and install four screws (55).

**NOTE**

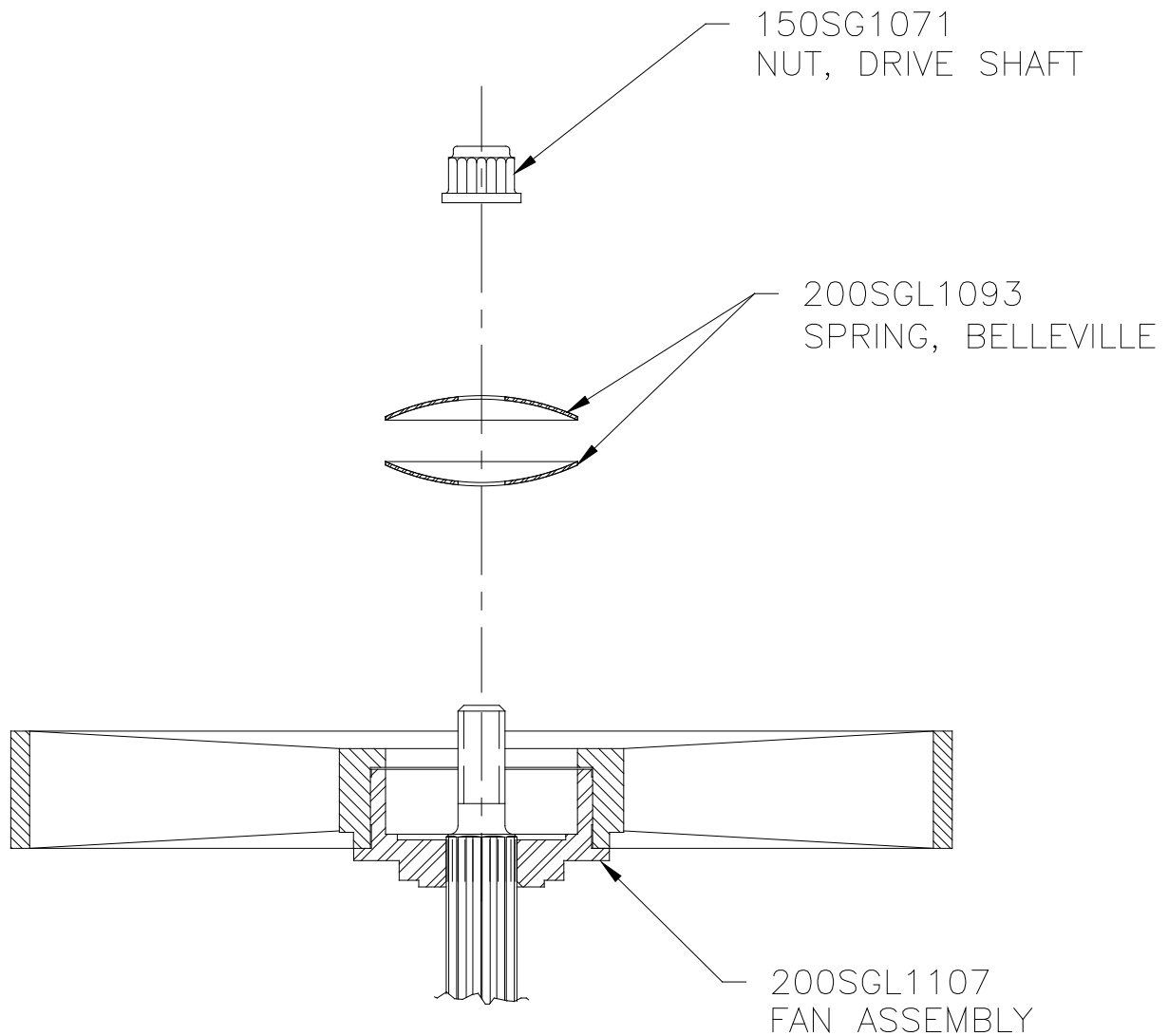
**The rewinding of the armature or stator  
in this generator is not recommended.**

**The varnishes used cannot be removed without  
destroying the magnetic qualities of the  
armature which in turn will degrade engine  
starting and brush life.**

**ANY REPAIRS OR ALTERATIONS  
TO THIS GENERATOR,  
NOT COVERED BY THIS MANUAL,  
ARE NOT RECOMMENDED.**



**Figure 2-9**  
**Generator Schematic Wiring Diagram**



**Figure 2-10**  
**Belleville Spring Installation Instructions**

(Ref. Section VI for 200SGL119Q, 200SGL119Q-2, 200SGL131Q-5 & 200SGL153Q)



**INCORRECT INSTALLATION**



**CORRECT INSTALLATION**

***Incorrect installation will result in reduction of brush life, reduction of Starter-Generator life and may result in unrepairable damage***

**Figure 2-11  
Positioning of Brush Leads**



## SECTION III

### TEST PROCEDURE

#### 3-1 GENERAL

- 3-2 If the unit under test fails to meet any of the following requirements and visual inspection does not disclose the cause of the trouble, disassemble and repeat inspection and testing as instructed in Section II. After reassembling, repeat procedure from the beginning.

#### 3-3 TEST EQUIPMENT AND PREPARATION FOR TEST

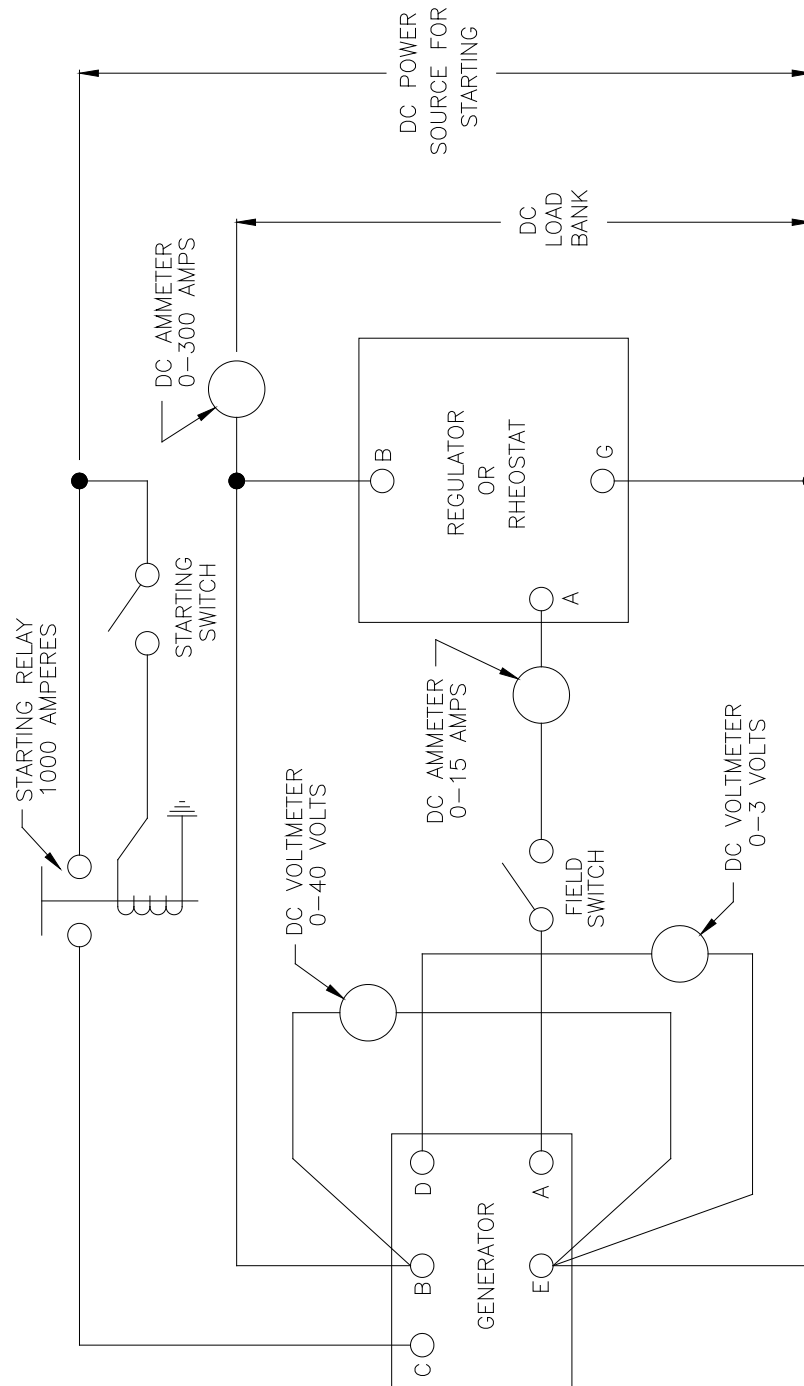
- 3-4 The standard test equipment required is a generator test stand capable of speed of 6,500 to 14,000 rpm and a cabinet containing the necessary wiring, switches and meters as shown in Figure 3-1. The load bank should provide graduated load steps and a minimum load rating of 200 amperes.

#### 3-5 VOLTAGE REGULATION

For voltage regulation, connect a carbon pile regulator, Generator Control Unit or rheostat capable of controlling the field current from 0 to 10 amperes as shown in Figure 3-1.

#### 3-6 AMBIENT TEMPERATURE

Conduct all tests with an air inlet temperature of 50 degrees F (10 degrees C) to 104 degrees F (40 degrees C). A blower supplying cooling air with a static pressure of 6" inches of water measured in the cooling duct 8" upstream from the generator is required for all tests except minimum speed.



**Figure 3-1**  
**Test Schematic for Testing Series Starter Generators**  
(with "C" terminal)



### 3-7 FLASHING THE FIELD

If required, flash the field as follows:

- a. Connect the positive terminal of a 12-volt battery through a single-pole, single-throw knife switch to generator terminal A on the terminal board (Figure 2-9).
- b. Connect the negative terminal of the battery to terminal E on the generator terminal board.
- c. Apply battery current to the field for 5 seconds by closing the knife switch.
- d. Repeat the operation several times to be sure that the field is properly flashed.

#### **WARNING**

**Use a knife switch when flashing the field.  
Opening or closing the circuit at the generator or  
battery terminals can result in severe  
damage to the generator or battery terminals  
or explosion of the battery.**

#### **CAUTION**

**Do not flash field while generator is in  
operation.**



### 3-8 TEST CONNECTION

- a. Connect the starter-generator to the test circuit, as shown in Figure 3-1.
- b. Move all load switches to the OFF position.
- c. Attach a thermocouple directly over a pole shoe screw to measure yoke temperature.

### 3-9 ROTATION

Operate the starter-generator in a counter-clockwise direction, as viewed from the drive-end, during the tests.

#### **NOTE**

**Brush run-in by motorizing the starter-generator can be utilized in lieu of Paragraph 3-10. See the enclosed copy of SAI Service Bulletin SB150SG105.**

### 3-10 BRUSH SEATING

- a. Start the drive motor and increase the starter-generator speed to approximately 8100 rpm as indicated on a tachometer.
- b. Close suitable switches on the DC load bank to apply 50 amperes load as indicated on the DC load ammeter.
- c. Operate the starter-generator for a minimum of two hours. Shut off the starter-generator at the end of this period.
- d. Examine the brush seating one brush at a time. The face of each brush should contact the commutator surfaces 100 percent in the direction of rotation, and at least 85 percent of the surface parallel to the armature shaft. (See Figure 3-2).



- e. If the brush seating is close to the required values, increase the DC load between 75 and 125 amperes for short periods while inspecting to see if the brushes are properly seated. See Figure 3-2 for typical brush seating.

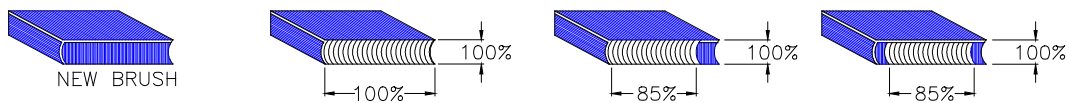
**NOTE**

**Using a brush spring lifter  
when removing the brushes from  
the brush holders, be sure to  
return each brush to the brush holder  
from which it was removed.**

- f. When the brush seating is completed, open all load switches and shut down the starter-generator. Allow the unit to cool before proceeding with tests. Record readings on test data sheet, Table V.

**CAUTION**

**Do not use abrasives or abrasive  
stones to seat the brushes.**



SATISFACTORILY SEATED BRUSHES



UNSATISFACTORILY SEATED BRUSHES



**Figure 3-2**  
**Typical Brush Seating**



### 3-11 TEST

### 3-12 CONTINUOUS OPERATING CONDITION

Continuous operating condition is defined as follows:

While the starter-generator is cold, the resistance and temperature of the shunt field shall be determined for use in calculating the average field temperature rise during continuous operation at full load. The starter-generator is considered to have reached its continuous operating condition when the rate of rise of the shunt field temperature does not increase by more than two (2) degrees F during a five minute period.

### 3-13 MAXIMUM SPEED FOR REGULATION

The starter-generator should not be given an operational warm-up prior to this test. Perform the test as follows:

- a. Connect starter-generator to the generator test stand.
- b. Place all load switches to the OFF position.
- c. Increase the speed of the drive motor until a reading of 13,000 rpm is obtained on the tachometer. Adjust the field rheostat or carbon pile regulator until generator voltmeter reads 30 volts. Shunt field voltage current should not be less than 0.81 amperes minimum.
- d. Reduce the drive motor to zero rpm.
- e. Record readings on test data sheet, Table V.



### 3-14 HEATING, COMMUTATION, MINIMUM SPEED AND EQUALIZING VOLTAGE

a. MINIMUM SPEED FOR REGULATION  
(Stabilization Not Required)

Decrease the starter-generator speed to 7050 rpm. The starter-generator must deliver 200 amperes at 27-28 volts. Operate the starter-generator (stabilization not required) and record field current, which should not exceed 10.0 amperes. Record readings on test data sheet, Table V.

b. CONTINUOUS OPERATING SPEED

Start the drive motor. Increase the speed of the starter-generator to 12,100 rpm. Close suitable switches of the DC load bank to apply a load of 200 amperes at  $30 \pm 0.1$  volts VDC. When the starter-generator reaches its continuous operating conditions as described in Paragraph 3-12, (no more than 2 degrees F rise in five minutes) check the readings of the temperature instruments. Frame temperature should not exceed air inlet temperature by 175 degrees F. Record readings on test data sheet, Table V.

c. EQUALIZING VOLTAGE

Measure the paralleling voltage across terminals D and E (Figure 2-9). See Figures 3-3 and 3-4. Refer to Table IV for which table to use. Record readings on test data sheet, Table V.



**TABLE IV**  
**Equalizing Voltage Chart**

| <b>STARTER GENERATOR</b>                                                                                                                                               |                                                                                                                                      | <b>EQUALIZING VOLTAGE CHART</b> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| 200SGL111Q<br>200SGL111Q-2<br>200SGL114Q<br>200SGL115Q<br>200SGL115Q-2<br>200SGL117Q<br>200SGL120Q<br>200SGL124Q                                                       | 200SGL130Q<br>200SGL131Q-2<br>200SGL132Q<br>200SGL132Q-2<br>200SGL132Q-3<br>200SGL132Q-4<br>200SGL132Q-5<br>200SGL144Q<br>200SGL145Q | USE CHART 1                     |
| 200SGL111Q-3<br>200SGL112Q<br>200SGL118Q<br>200SGL119Q<br>200SGL119Q-2<br>200SGL121Q<br>200SGL129Q<br>200SGL129Q(1)<br>200SGL129Q(3)<br>200SGL129Q(4)<br>200SGL129Q(5) | 200SGL129Q(8)<br>200SGL131Q<br>200SGL131Q-5<br>200SGL142Q<br>200SGL147Q<br>200SGL147Q-2<br>200SGL147Q-3<br>200SGL151Q<br>200SGL153Q  | USE CHART 2                     |

### 3-15 COMMUTATION AND COMPOUNDING

Immediately following the previous heat runs with the starter-generator hot, observe the commutation of the starter-generator over the speed range of 7050, 10,000 and 12,000 rpm at no-load, half-load, full-load. Sparking must be limited to pin point sparking at the brushes. Commutator should be black for best generator performance. Modify a fan cover to have a plastic window. Rotate the cover to observe each brush when performing this test. If sparking is excessive, check brush seating surfaces and brush tension. The field current must increase with any increase in generator load. Record readings on test data sheet, Tables V, VI, or VII as applicable.



**CAUTION**

**Do not use abrasives or abrasive stones to seat the brushes.**

**CAUTION**

**If the plastic window is not available, and the test is to be performed with the cover removed. The test must be completed in 3 to 4 minutes since proper cooling cannot be maintained and the starter-generator may overheat.**

**3-16 OVERSPEED**

- a. Perform this test with the starter-generator hot as a result of testing.
- b. Open all load switches and the field switch
- c. Increase the speed of the starter-generator to 14,000 rpm. The starter-generator must operate at this speed for 5 minutes without mechanical failure, throwing of varnish or impairment of electrical performance.
- d. At the end of 5 minutes overspeed run, reduce the speed to 12,000 rpm. Close suitable load switches to obtain rated load of 200 amperes.
- e. Operate the starter-generator for 1 minute and check the electrical performance which should compare with that observed in paragraph 3-15. Record readings on test data sheet, Table V.

**NOTE:**

**If a generator test stand capable of 14,000 RPM is not available, the overspeed test can be performed by energizing the starter generator as a motor and adjusting the no load speed to the required 14,000 RPM.**



### 3-17 DIELECTRIC STRENGTH TEST (IPL FIG. 4-1)

Perform this test while the starter-generator is hot as a result of testing.

- a. Remove all external connections from the terminals. Disconnect the terminal block (20) by removing the block. Remove two screws (43) and disconnect wire terminals.
- b. Using a Hi-Pot, apply 250 volts AC, 60 Hz between E and the stator housing (ground).
- c. Apply the same voltage between series field and interpole and compensating field terminals (D, E, B and C) and the stator housing (ground).
- d. The insulation should not breakdown.

**CAUTION**

**Do not apply voltage across shunt,  
Series interpole and compensating fields  
As damage may occur.**

- e. After the dielectric strength test, install and reconnect the terminal block (20). Reconnect wire terminals and install two screws (43).
- f. Record readings on test data sheet, Table V.



### 3-19 ACCELERATION RUN

- a. Remove the starter-generator from the generator test stand and allow the unit to cool. Then connect to an acceleration test stand with a steel flywheel 12 inches in diameter and .836 inches thick. A 3.187 inch flywheel may be used in lieu of 0.836 inch thick flywheel. The flywheel should rotate on ball bearings sized to the weight and RPM of the wheel.

**CAUTION**

**The flywheel should be protected  
by a metal protective shield to avoid  
injury.**

- b. With 28 volts DC starting power applied, close starting switch. The starter-generator must accelerate the standard flywheel (0.836 in. thick) to a speed of 6,500 rpm within 36 seconds, or the optional flywheel (3.187 in. thick) to a speed of 4,500 rpm within 25 seconds.
- c. Record peak in rush current (1000 amps maximum) and time to reach 6,500 rpm / 4,500 rpm on test data sheet. Record readings on test data sheet, Table V.

### 3-20 COMMUTATOR FILM

It is important for brush life and good generator operating characteristics that the commutator have a black film. Inspect the commutator after the final test for a black film. If the film is not evident, run the generator at 10,000 rpm and 200 amperes for 30 minutes.

### 3-21 COMMUTATOR RUN-OUT

Using a dial indicator firmly mounted to the generator and with the probe located on the commutator, the total commutator run-out shall be .0005 inch maximum. Bar to bar run-out shall be .0002 inch maximum. Record readings on test data sheet, Table V.



### 3-22 VIBRATION

Radial Vibration. After completion of the preceding tests, place generator in a rubber padded cradle or test stand. Accelerate to 4000 – 4500 RPM no load speed and check with Metrix miniature vibration meter or equivalent. Vibration shall not exceed 0.001 inch total deflection as a starter and supported in a resilient cradle or test stand. Metrix miniature vibration meter set in Displacement mode shall read  $\leq 1.0$  that equals  $\leq 0.001$  inch total deflection. It shall be permissible to employ a drive shaft support during the test to keep the drive shaft in axial alignment. Record readings on test data sheet, Table V.

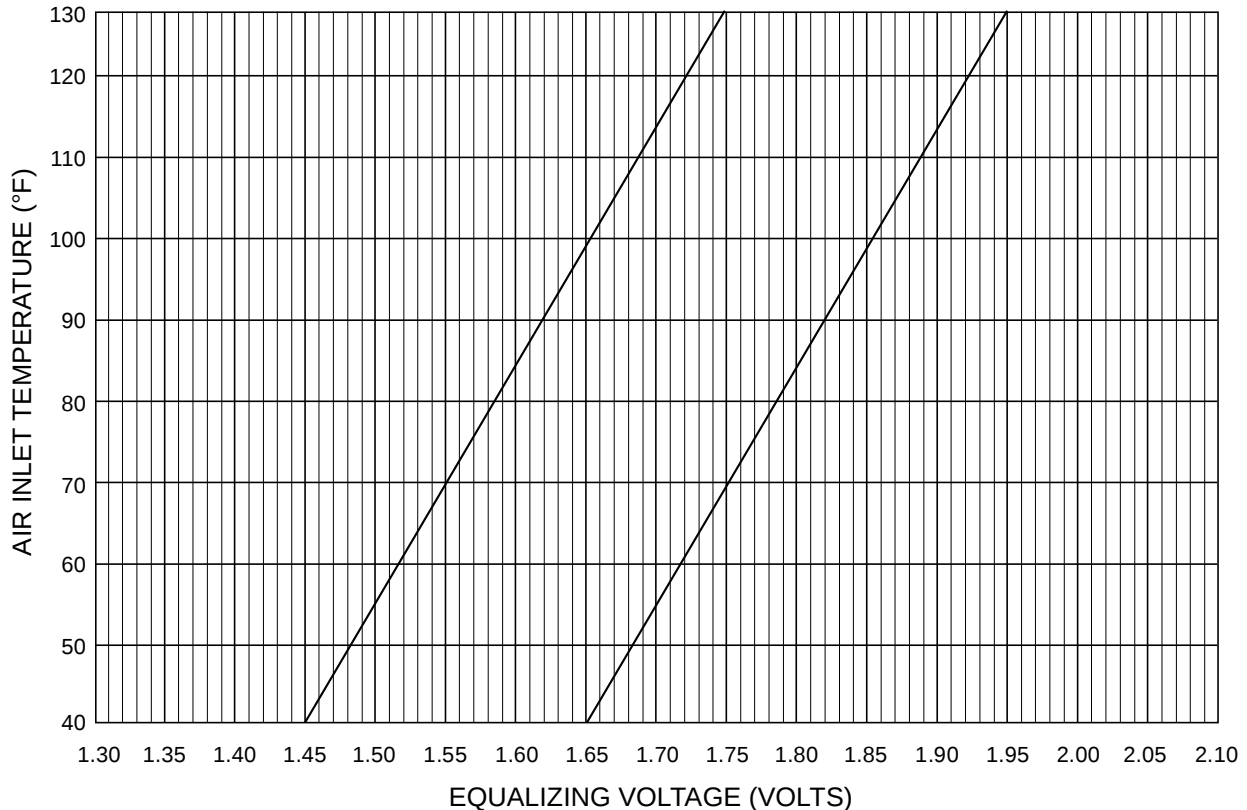
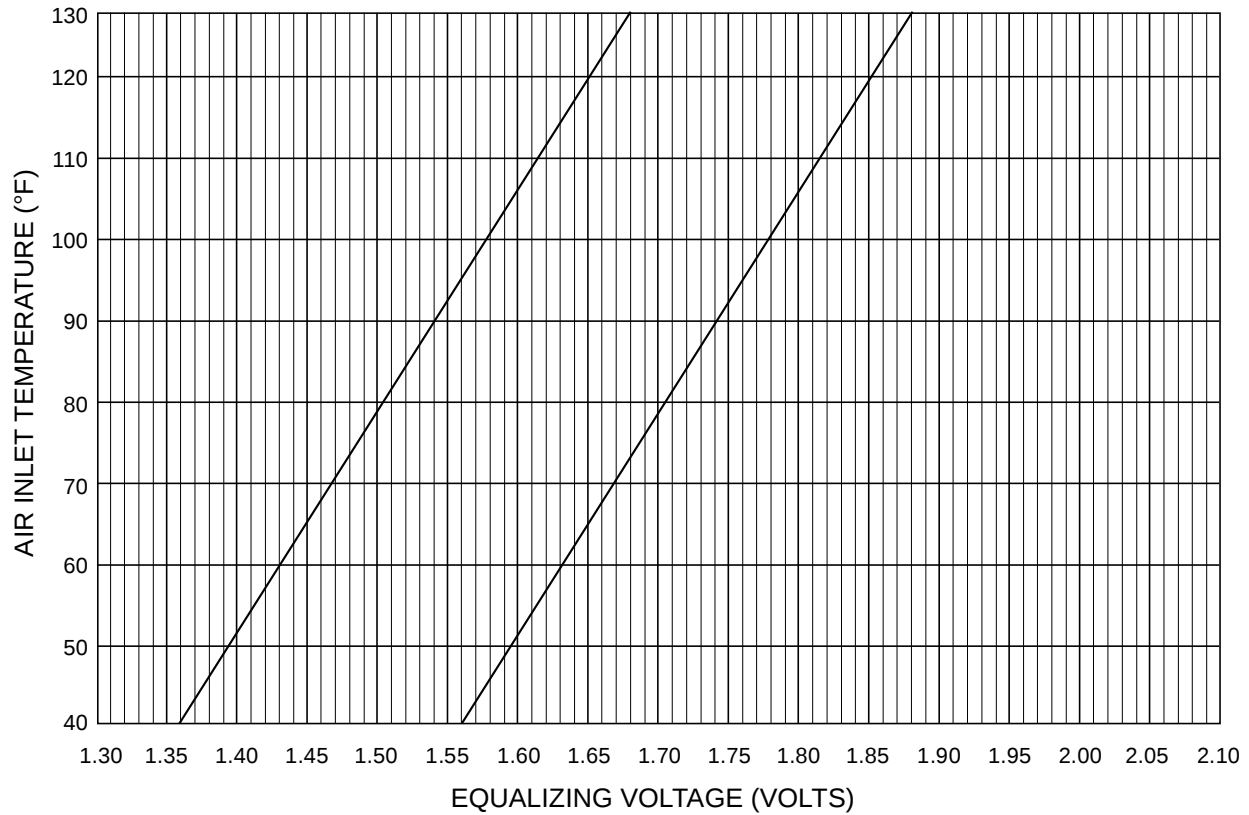


Figure 3-3 Equalizing Voltage (Series) Chart 1



**Figure 3-4 Equalizing Voltage (Shunt) Chart 2**



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**TABLE V**  
**200SGL SERIES ACCEPTANCE TEST DATA SHEET**

REPAIR STATION NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

TESTED PER \_\_\_\_\_ TM105A

REV \_\_\_\_\_

REPAIR STATION CERTIFICATE NO. \_\_\_\_\_

REV DATE \_\_\_\_\_

|                               |  |                     |                               |                    |                                     |  |
|-------------------------------|--|---------------------|-------------------------------|--------------------|-------------------------------------|--|
| S/G MODEL NO.<br>200SGL _____ |  | SERIAL NO.<br>_____ | SALES/WORK ORDER NO.<br>_____ | TESTED BY<br>_____ | DATE: _____<br>TEST STAND NO. _____ |  |
| MOD / REV _____               |  |                     |                               |                    |                                     |  |

| TEST PARA.  | INSPECTION / TEST                                                                                      | REQUISITES                                                                                                         | MEASUREMENT                                            |      | ACC | REJ |
|-------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|------|-----|-----|
| 3-10        | Brush Seating                                                                                          | 100% Seating all Brushes (See Fig. 3-2)                                                                            | X                                                      | X    |     |     |
| 3-13        | Maximum Speed for Regulation<br>13,000 +0/-100 RPM No Load,<br>30.0 ± 0.1 VDC                          | Ammeter readout (A+) 0.81 amps min.                                                                                |                                                        | amps |     |     |
| 3-14a       | Minimum Speed for Regulation<br>7,050 +100/-0 RPM 27-28 ± 0.1<br>VDC, 200 ± 5 Amp                      | Field Current (A+ within 10.0 amps)                                                                                |                                                        | amps |     |     |
| 3-14b,c     | Continuous Operating Speed<br>and Equalizing Voltage<br>12,100 ± 100 RPM,<br>200 ± 5 Amp, 30 ± 0.1 VDC | D - E Voltage (See Figs 3-3 and 3-4)                                                                               |                                                        | vdc  |     |     |
|             |                                                                                                        | Stabilized Temp. (gen. yoke)                                                                                       |                                                        | °F   |     |     |
|             |                                                                                                        | Air In Temp.                                                                                                       |                                                        | °F   |     |     |
| 3-15        | Commutation<br>27 VDC min. and<br>Compounding                                                          | 7050 +100/-0 RPM,<br>0, 100, 200 (± 5) Amp                                                                         | Not to exceed pinpoints, Field Current rises with Load | X    | X   |     |
|             |                                                                                                        | 10,000 ± 100 RPM,<br>0, 100, 200 (± 5) Amp                                                                         | Not to exceed pinpoints, Field Current rises with Load | X    | X   |     |
|             |                                                                                                        | 12,000 ± 100 RPM,<br>0, 100, 200 (± 5) Amp                                                                         | Not to exceed pinpoints, Field Current rises with Load | X    | X   |     |
| *Section VI | *Speed Pickup (6000 ± 100 RPM)                                                                         | Output 2.5 volts peak to peak min.                                                                                 | X                                                      | vdc  |     |     |
|             |                                                                                                        | Wave form shape                                                                                                    | X                                                      | X    |     |     |
| 3-16        | Overspeed 5 min 14,000<br>± 100 RPM                                                                    | No Sign of Failure                                                                                                 | X                                                      | X    |     |     |
|             | Post Overspeed 12,000 ± 100<br>RPM, 30 ± 0.1 VDC, 200 ± 5<br>Amps                                      | No Sign of Failure                                                                                                 | X                                                      | X    |     |     |
| 3-17        | Dielectric Strength<br>250 ± 10 VAC, RMS, 1.0 sec                                                      | No Sign of Failure                                                                                                 | X                                                      | X    |     |     |
| 3-19        | Acceleration Run (cranking)<br>28.5 + 0/-0.5 VDC Supply<br>Voltage                                     | Peak Current (1000 amps max)                                                                                       |                                                        | amps |     |     |
|             |                                                                                                        | 0 - 6500 ± 100 RPM within 36 seconds for series starter generators.                                                |                                                        | sec  |     |     |
|             |                                                                                                        | 0 - 6500 ± 100 RPM within 50 seconds for series starter generators, with optional 3.187 inch thick flywheel.       |                                                        | sec  |     |     |
|             |                                                                                                        | 0 - 3800 ± 100 RPM within 30 seconds for shunt starter generators (Section VI).                                    |                                                        |      |     |     |
|             |                                                                                                        | 0 - 3800 ± 100 RPM within 40 seconds for shunt starter generators, with optional .836 thick Flywheel (Section VI). |                                                        |      |     |     |
| 3-21        | Commutator Runout                                                                                      | Bar-to-Bar (not to exceed 0.0002 inch)                                                                             |                                                        | inch |     |     |
|             |                                                                                                        | TIR (not to exceed 0.0005 inch)                                                                                    |                                                        | inch |     |     |
| 3-22        | Radial Vibration,<br>4000 - 4500 RPM (when<br>applicable)                                              | Within Limits (0.001 inch total max)                                                                               |                                                        | inch |     |     |



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**TABLE VI**  
**ACCEPTANCE TEST DATA SHEET**

| S/G MODEL NO.<br><input type="checkbox"/> 200SGL132Q-3<br><input type="checkbox"/> 200SGL132Q-4<br><input type="checkbox"/> 200SGL132Q-5<br>REV |                                                                                                                                                                     | SERIAL NO.<br>_____                                                                                         | SALES ORDER NO.<br>_____ | TESTED BY:<br>_____ | DATE:<br>_____ |                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|--------------------------|---------------------|----------------|----------------------|
| ATP<br>PARA                                                                                                                                     | INSPECTION/TEST                                                                                                                                                     | REQUISITES                                                                                                  | MEASUREMENT              | ACC                 | REJ            | TEST<br>STAND<br>NO. |
|                                                                                                                                                 | Visual Inspection                                                                                                                                                   | Complete and without obvious damage                                                                         |                          |                     |                |                      |
| 3-13                                                                                                                                            | Maximum Speed for Regulation<br>13,000 + 0 / -100 RPM No<br>Load, 30 ± 0.1 VDC                                                                                      | Voltmeter readout (B+ to A-)<br>Ammeter readout (A -)<br>Ext. Field Resistance (within 35 ohms)             | vdc<br>amps<br>ohms      |                     |                |                      |
| 3-14b,c                                                                                                                                         | Continuous Operating<br>Speed and Equalizing<br>Voltage, Stabilized<br>12,000 ± 100 RPM, 30<br>± 0.1V, 200 ± 5 Amp                                                  | Voltmeter readout (D to E)<br><br>Air Inlet Temperature                                                     | vdc<br><br>°F            |                     |                |                      |
| 3-14a                                                                                                                                           | Minimum Speed for Regulation<br>7,050 +100 / -0 RPM, 27 VDC<br>min., 200 ± 5 Amp                                                                                    | Voltmeter readout (A+ to B+)<br>Field Current (A+ within 10.0 amps)<br>Ext. Field resistance (0.5 ohms min) | vdc<br>amps<br>ohms      |                     |                |                      |
|                                                                                                                                                 | Residual Voltage<br>7,050 +100 / -0 RPM                                                                                                                             | Voltmeter readout (B to E)<br>0.8V minimum                                                                  | vdc                      |                     |                |                      |
| 3-15                                                                                                                                            | Compounding 30 ± 0.1 VDC,<br>12,000 ± 100 RPM,<br>0, 50, 100, 150, 200 ± 5 Amps                                                                                     | Field Current rises with load                                                                               |                          |                     |                |                      |
| 3-15                                                                                                                                            | Commutation 27 VDC min.<br>7050 +100 / -0 RPM,<br>0, 100, 200 (± 5) Amp<br>10,000 ± 100 RPM,<br>0, 100, 200 (± 5) Amp<br>12,000 ± 100 RPM,<br>0, 100, 200 (± 5) Amp | Not to exceed pinpoints<br>Not to exceed pinpoints<br>Not to exceed pinpoints                               |                          |                     |                |                      |
| 3-16                                                                                                                                            | Overspeed 5 min. 14,000<br>+ 0 / - 100 RPM                                                                                                                          | No sign of failure                                                                                          |                          |                     |                |                      |
| 3-19                                                                                                                                            | Acceleration: 0-6500 RPM<br>28.5 ± 0.1 VDC                                                                                                                          | Peak in rush current (1000 amps<br>max.)<br>Acceleration Time (45 sec. Max.)                                | amps<br>sec              |                     |                |                      |
| 3-17                                                                                                                                            | Dielectric Strength<br>250 VAC, RMS, 1.0 sec                                                                                                                        | No Sign Of Breakdown                                                                                        |                          |                     |                |                      |
| 3-22                                                                                                                                            | Radial Vibration                                                                                                                                                    | Within Limits (0.2 ips peak max. at<br>9,200 ± 100 RPM)                                                     | ips                      |                     |                |                      |
| 3-21                                                                                                                                            | Commutator<br>Runout                                                                                                                                                | Bar-to-Bar (not to exceed 0.0002 inch)<br>TIR (not to exceed 0.0005 inch)                                   | inch<br>inch             |                     |                |                      |

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**TABLE VII**  
**ACCEPTANCE TEST DATA SHEET**

| S/G MODEL NO.<br>200SGL151Q__<br>REV _____                        |                                                                                                                                                                                                          | SERIAL NO.<br>_____                             | SALES ORDER NO.<br>_____ | TESTED BY:<br>_____ | DATE: _____<br>TEST STAND<br>NO. _____ |  |
|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|--------------------------|---------------------|----------------------------------------|--|
| ATP<br>PARA.                                                      | INSPECTION/TEST                                                                                                                                                                                          | REQUISITES                                      | MEASUREMENT              | ACC                 | REJ                                    |  |
|                                                                   | Visual Inspection                                                                                                                                                                                        | Complete and without obvious damage             |                          |                     |                                        |  |
| 3-13                                                              | Maximum Speed for Regulation<br>13,000 + 0 / -100 RPM No Load,<br>30 ± 0.1 VDC                                                                                                                           | Voltmeter readout (B+ to A+)                    | vdc                      |                     |                                        |  |
|                                                                   |                                                                                                                                                                                                          | Field Current (A+)                              | amps                     |                     |                                        |  |
|                                                                   |                                                                                                                                                                                                          | Ext. Field Resistance (within 35 ohms)          | ohms                     |                     |                                        |  |
| 3-14a                                                             | Minimum Speed for Regulation<br>7,050 +100 / -0 RPM,<br>27 ± 0.1VDC min., 200 ± 5 Amp                                                                                                                    | Voltmeter readout (A+ to B+)                    | vdc                      |                     |                                        |  |
|                                                                   |                                                                                                                                                                                                          | Field Current (A+ within 10.0 amps)             | amps                     |                     |                                        |  |
|                                                                   |                                                                                                                                                                                                          | Ext. Field Resistance (0.5 ohms min)            | ohms                     |                     |                                        |  |
| 3-14b,c                                                           | Continuous Operating Speed and<br>Equalizing Voltage, Stabilized<br>12,000 ± 100 RPM, 30 ± 0.1V, 200<br>± 5 Amp                                                                                          | Voltmeter Readout (D to E)                      | vdc                      |                     |                                        |  |
|                                                                   |                                                                                                                                                                                                          | Air Inlet Temperature                           | °F                       |                     |                                        |  |
| 3-15                                                              | Commutation<br>27 VDC min.                                                                                                                                                                               | 7050 +100 / -0 RPM,<br>0, 100, 200 (± 5) Amp    | Not to exceed pinpoints  |                     |                                        |  |
|                                                                   |                                                                                                                                                                                                          | 10,000 ± 100 RPM,<br>0, 100, 200 (± 5) Amp      | Not to exceed pinpoints  |                     |                                        |  |
|                                                                   |                                                                                                                                                                                                          | 12,000 ± 100 RPM,<br>0, 100, 200 (± 5) Amp      | Not to exceed pinpoints  |                     |                                        |  |
| 3-15                                                              | Compounding 30 ± 0.1 VDC,<br>12,000 ± 100 RPM<br>0, 50, 100, 150, 200 (± 5) Amps                                                                                                                         | Field Current rises with load                   |                          |                     |                                        |  |
|                                                                   | <b>THIS TEST IS NOT REQUIRED</b><br>Magnetic Speed Pickup<br>6,000 ± 100 rpm                                                                                                                             | Output 2.5V peak to peak min                    | vdc                      |                     |                                        |  |
| Wave Form Shape                                                   |                                                                                                                                                                                                          |                                                 |                          |                     |                                        |  |
| 3-16                                                              | Overspeed 5 min 14,000<br>± 100 RPM                                                                                                                                                                      | No Sign Of Failure                              |                          |                     |                                        |  |
| 3-22                                                              | Radial Vibration<br>4,000 – 4,500 RPM                                                                                                                                                                    | Within Limits (.001 inch Total Deflection max.) | units                    |                     |                                        |  |
| 3-17                                                              | Dielectric Strength<br>250 ± 10 VAC, RMS, 1.0 sec                                                                                                                                                        | No Sign Of Breakdown                            |                          |                     |                                        |  |
|                                                                   | <b>THIS TEST IS NOT REQUIRED</b><br>Acceleration Starter<br>Cranking Torque and Speed at<br>28.5 + 0, -0.5 VDC Supply Voltage<br>(1783 lb. in <sup>2</sup> Flywheel)<br><b>THIS TEST IS NOT REQUIRED</b> | Peak In Rush Current (1000 amps max)            | amps                     |                     |                                        |  |
| 0-6500 ± 100 RPM within 45 seconds for<br>series start generators |                                                                                                                                                                                                          | sec                                             |                          |                     |                                        |  |
| 0-4500 ± 100 RPM within 25 seconds for<br>shunt start generators  |                                                                                                                                                                                                          | sec                                             |                          |                     |                                        |  |
| 3-21                                                              | Commutator<br>Runout                                                                                                                                                                                     | Bar-to-Bar (not to exceed 0.0002 inch)          | inch                     |                     |                                        |  |
|                                                                   |                                                                                                                                                                                                          | TIR (not to exceed 0.0005 inch)                 | inch                     |                     |                                        |  |

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## SECTION IV

### ILLUSTRATED PARTS CATALOG

**A. General**

This section contains listings of assemblies and detail parts.

**B. Figure and Index Numbers**

The figure and index numbers indicate the figure on which the part is illustrated and its identification on the illustration.

**C. Part Numbers**

This column contains numbers for identification of parts.

**D. Description**

Description of each item is indented by columns to indicate relationship to the next higher assembly.

**E. Units Per Assembly**

The numbers listed in the "Units per Assembly" column indicates the quantity of parts used per assembly at the location shown, and are not necessarily the total quantity used per unit.

**F. Numerical Index**

This index contains an alphabetical and numerical listing of part numbers and is crossed referenced to figure and index number. The part number is listed once with its corresponding figure and index number or numbers in the appropriate column. The quantity shown is the total quantity used per unit.

**G. Nameplates—Suffix Letter "S"**

Nameplates for starter generators manufactured by Aircraft Parts Corporation of Holtsville/Farmingdale, New York will not have suffix letter "S". Nameplates obtained from Skurka Aerospace Inc. will include suffix letter "S" at the end of the basic nameplate part number.



## NUMERICAL INDEX

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| AN960C10       | 4-1-29             | 2               |
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| AN960C616      | 4-1-27             | 3               |
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| MS16624-4066   | 4-1-4              | 1               |
| MS21318-13     | 4-1-38             | 4               |
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| MS3112E8-3P    | 4-2-33             | 1               |
| MS35265-65     | 4-1-30             | 2               |
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| MS35338-43     | 4-1-31             | 2               |
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| MS35489-1      | 4-2-14             | 1               |
| MS35265-19     | 4-2-36             | 4               |
| MS35266-59     | 4-2-35A            | 1               |
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| NAS1189-06P12B | 4-2-25             | 2               |
| 150SG1389-6    | 4-1-26             | 3               |
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| 150SG1014      | 4-1-52             | 1               |
| 150SG1014-1    | 4-1-52             | 1               |
| 150SG1017      | 4-1-5              | 2               |
| 150SG1036      | 4-1-45             | 1               |
| 150SG1045      | 4-3-7              | 8               |
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| 150SG1105       | 4-1-49             | 8               |
| 150SG1106       | 4-1-15             | 8               |
| 150SG1106-1     | 4-1-15             | 8               |
| 150SG1108       | 4-1-2              | 1               |
|                 | 4-2-57             | 1               |
| 150SG1112-1     | 4-3-5              | 8               |
| 150SG1113       | 4-1-17             | 8               |
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| 150SG1168       | 4-1-40             | 1               |
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| 200SGL1006      | 4-1-41A            | 1               |
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| 200SGL1009      | 4-3-11             | 4               |
| 200SGL1009-3    | 4-3-11             | 4               |
| 200SGL1009-5    | 4-3-11             | 4               |
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| 200SGL1009-10X2 | 4-3-11             | 4               |
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| 200SGL1011-5    | 4-2-58             | 1               |
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| 200SGL1011-14   | 4-1-53             | 1               |
| 200SGL1011-15   | 4-1-53             | 1               |
| 200SGL1011-17   | 4-1-53             | 1               |
| 200SGL1014-1    | 4-2-52A            | 1               |
| 200SGL1014-2    | 4-1-52             | 1               |
| 200SGL1014-7    | 4-2-58             | 1               |
| 200SGL1014-4    | 4-1-52             | 1               |
| 200SGL1014-5    | 4-1-52             | 1               |
| 200SGL1014-6    | 4-2-52A            | 1               |



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| 200SGL1028-2    | 4-1-10             | 1               |
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| 200SGL1040      | 4-1-1              | 1               |
| 200SGL1040-1    | 4-1-1              | 1               |
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| 200SGL1052-7    | 4-1-6              | 1               |
| 200SGL1052-5    | 4-1-6              | 1               |
| 200SGL1057      | 4-3-3              | 2               |
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| 200SGL1070      | 4-1-8              | 1               |
| 200SGL1073      | 4-1-9              | 1               |
| 200SGL1083      | 4-1-               | 1               |
| 200SGL1083-1    | 4-1-               | 1               |
| 200SGL1083-2    | 4-1                | 1               |
| 200SGL1083-3    | 4-1-               | 1               |
| 200SGL1092      | 4-1-37             | 1               |
| 200SGL1092-1    | 4-1-37             | 1               |
| 200SGL1092-2    | 4-1-37             |                 |
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| 200SGL1092-10   | 4-1-37             | 1               |
| 200SGL1092-10X2 | 4-1-37             | 1               |
| 200SGL1092-12   | 4-1-37             | 1               |



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| 200SGL1092-49  | 4-1-37             | 1               |
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| 200SGL1092-53  | 4-1-37             | 1               |
| 200SGL1092-56  | 4-1-37             | 1               |
| 200SGL1092-57  | 4-1-37             | 1               |
| 200SGL1092-64  | 4-1-37             | 1               |
| 200SGL1092-67  | 4-1-37             | 1               |
| 200SGL1092-72  | 4-1-37             | 1               |
| 200SGL1092-75  | 4-1-37             | 1               |
| 200SGL1092-76  | 4-1-37             | 1               |
| 200SGL1093     | 4-1-46             | 2               |
|                | 4-1-46             | 3               |
| 200SGL1103     | 4-1-7              | 1               |
| 200SGL1103-1   | 4-1-7              | 1               |
| 200SGL1103-2   | 4-1-7              | 1               |
| 200SGL1103-3   | 4-1-7              | 1               |
| 200SGL1103-5   | 4-1-7              | 1               |
| 200SGL1103-9   | 4-1-7              | 1               |
| 200SGL1103-10  | 4-1-7              | 1               |
| 200SGL1103-11  | 4-1-7              | 1               |
| 200SGL1103-13  | 4-1-7              | 1               |
| 200SGL1103-17  | 4-1-7              | 1               |
| 200SGL1103-18  | 4-1-7              | 1               |
| 200SGL1103-19  | 4-1-7              | 1               |
| 200SGL1103-21  | 4-1-7              | 1               |
| 200SGL1107     | 4-1-45             | 1               |
| 200SGL1107-2   | 4-1-45             | 1               |
| 200SGL1107-4   | 4-1-45             | 1               |
| 200SGL1107-5   | 4-1-45             | 1               |
| 200SGL1108     |                    | 1               |
| 200SGL1126     | 4-1-               | 1               |
| 200SGL1126-1   | 4-2-               | 1               |



## NUMERICAL INDEX

| Part Number   | Fig & Index Number | Qty per Article |
|---------------|--------------------|-----------------|
| 200SGL1126-2  | 4-2-               | 1               |
| 200SGL1126-3  | 4-2-               | 1               |
| 200SGL1126-4  | 4-2-               | 1               |
| 200SGL1126-5  | 4-2-               | 1               |
| 200SGL1126-6  | 4-1-1              | 1               |
| 200SGL1138    | 4-3-               | 4               |
| 200SGL1138-1  | 4-3-               | 4               |
| 200SGL1153    | 4-1-48             | 1               |
| 200SGL1153-2  | 4-1-48             | 1               |
| 200SGL1154    | 4-3-1              | 4               |
| 200SGL1154-3  | 4-3-1              | 4               |
| 200SGL1156    | 4-1-19             | 1               |
| 200SGL1156-1  | 4-2-19B            | 1               |
| 200SGL1156-2  | 4-2-19C            | 1               |
| 200SGL1156-4  | 4-2-19C            | 1               |
| 200SGL1156-5  | 4-2-19D            | 1               |
| 200SGL1156-6  | 4-2-19C            | 1               |
| 200SGL1156-7  | 4-2-19C            | 1               |
| 200SGL1219-1  | 4-2-18             | 1               |
| 200SG1221     | 4-2-34             | 1               |
| 200SGL1301-1  | 4-1-               | 1               |
| 200SGL1301-2  | 4-1-               | 1               |
| 200SGL1301-3  | 4-1-               | 1               |
| 200SGL1318    | 4-2-24             | 1               |
|               |                    |                 |
| 200SGL1360S   | 4-1-40A            | 1               |
| 200SGL1360-1S | 4-1-40A            | 1               |
| 200SG1020     | 4-3-12             | 4               |
| 250SG1113     | 4-1-51             | 8               |
|               | 4-1-17             |                 |
| 250SG1116     | 4-1-55             | 4               |
|               | 4-2-55             | 4               |
| 250SG1302     | 4-1-12             | 6               |
| 250SG1093     | 4-1-46             | 3               |
| 300SG1222-2   | 4-2-35             | 1               |
| 400SG1237     | 4-2-35B            | 1               |
| 400SG1380     | 4-2-40C            | 1               |
|               |                    |                 |
|               |                    |                 |
|               |                    |                 |
|               |                    |                 |



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| FIG &<br>INDEX<br>NO. | PART<br>NUMBER | DESCRIPTION<br>1 2 3 4 5 6 7 | UNITS<br>PER<br>ASSY | USAGE<br>CODE                                             |
|-----------------------|----------------|------------------------------|----------------------|-----------------------------------------------------------|
| 4-1-                  | 200SGL111Q     | STARTER-GENERATOR ASSY       | 1                    | A                                                         |
| 4-1-                  | 200SGL112Q     | STARTER-GENERATOR ASSY       | 1                    | B                                                         |
| 4-1-                  | 200SGL114Q     | STARTER-GENERATOR ASSY       | 1                    | C                                                         |
| 4-1-                  | 200SGL115Q     | STARTER-GENERATOR ASSY       | 1                    | D                                                         |
| 4-1-                  | 200SGL117Q     | STARTER-GENERATOR ASSY       | 1                    | E                                                         |
| 4-1-                  | 200SGL118Q     | STARTER-GENERATOR ASSY       | 1                    | F                                                         |
| 4-1-                  | 200SGL119Q     | STARTER-GENERATOR ASSY       | 1                    | G                                                         |
| 4-1-                  | 200SGL120Q     | STARTER-GENERATOR ASSY       | 1                    | H                                                         |
| 4-1-                  | 200SGL121Q     | STARTER-GENERATOR ASSY       | 1                    | I                                                         |
| 4-1-                  | 200SGL124Q     | STARTER-GENERATOR ASSY       | 1                    | J                                                         |
| 4-1-                  | 200SGL129Q     | STARTER-GENERATOR ASSY       | 1                    | K                                                         |
| 4-1-                  | 200SGL129Q(1)  | STARTER-GENERATOR ASSY       | 1                    | SAME AS<br>K<br>EXCEPT ITEMS<br>SPECIFIED ON<br>PAGE 4-20 |
| 4-1-                  | 200SGL129Q(3)  | STARTER-GENERATOR ASSY       | 1                    |                                                           |
| 4-1-                  | 200SGL129Q(4)  | STARTER-GENERATOR ASSY       | 1                    |                                                           |
| 4-1-                  | 200SGL129Q(5)  | STARTER-GENERATOR ASSY       | 1                    |                                                           |
| 4-1-                  | 200SGL129Q(8)  | STARTER-GENERATOR ASSY       | 1                    |                                                           |
| 4-1-                  | 200SGL130Q     | STARTER-GENERATOR ASSY       | 1                    | L                                                         |
| 4-1-                  | 200SGL111Q-2   | STARTER-GENERATOR ASSY       | 1                    | M                                                         |



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| FIG &<br>INDEX<br>NO. | PART<br>NUMBER | DESCRIPTION<br>1 2 3 4 5 6 7 | UNITS<br>PER<br>ASSY | USAGE<br>CODE |
|-----------------------|----------------|------------------------------|----------------------|---------------|
| 4-1-                  | 200SGL111Q-3   | STARTER-GENERATOR ASSY       | 1                    | N             |
| 4-1-                  | 200SGL115Q-2   | STARTER-GENERATOR ASSY       | 1                    | O             |
| 4-1-                  | 200SGL119Q-2   | STARTER-GENERATOR ASSY       | 1                    | P             |
| 4-1-                  | 200SGL132Q     | STARTER-GENERATOR ASSY       | 1                    | Q             |
| 4-1-                  | 200SGL142Q     | STARTER-GENERATOR ASSY       | 1                    | R             |
| 4-1-                  | 200SGL144Q     | STARTER-GENERATOR ASSY       | 1                    | S             |
| 4-1-                  | 200SGL145Q     | STARTER-GENERATOR ASSY       | 1                    | T             |
| 4-1-                  | 200SGL147Q     | STARTER-GENERATOR ASSY       | 1                    | U             |
| 4-1-                  | 200SGL132Q-3   | STARTER-GENERATOR ASSY       | 1                    | V             |
| 4-1-                  | 200SGL131Q     | STARTER-GENERATOR ASSY       | 1                    | W             |
| 4-1-                  | 200SGL131Q-2   | STARTER-GENERATOR ASSY       | 1                    | X             |
| 4-1-                  | 200SGL151Q     | STARTER-GENERATOR ASSY       | 1                    | Y             |
| 4-1-                  | 200SGL132Q-4   | STARTER-GENERATOR ASSY       | 1                    | Z             |
| 4-1-                  | 200SGL147Q-2   | STARTER-GENERATOR ASSY       | 1                    | AA            |
| 4-1-                  | 200SGL147Q-3   | STARTER-GENERATOR ASSY       | 1                    | AB            |



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| FIG &<br>INDEX<br>NO. | PART<br>NUMBER | DESCRIPTION<br>1 2 3 4 5 6 7 | UNITS<br>PER<br>ASSY | USAGE<br>CODE                        |
|-----------------------|----------------|------------------------------|----------------------|--------------------------------------|
| 4-1-                  | 200SGL132Q-5   | STARTER-GENERATOR ASSY       | 1                    | AC                                   |
| 4-1-                  | 200SGL131Q-5   | STARTER-GENERATOR ASSY       | 1                    | AD                                   |
| 4-1-                  | 200SGL132Q-2   | STARTER-GENERATOR ASSY       | 1                    | AE                                   |
| 4-1-                  | 200SGL153Q     | STARTER-GENERATOR ASSY       | 1                    | AF                                   |
| 4-1-                  | 200SGL1083     | . QAD KIT                    | 1                    | A,D,H,J,M,N,O,Q,S,T<br>,AC           |
| 4-1-                  | 200SGL1083-1   | . QAD KIT                    | 1                    | C,E,F                                |
| 4-1-                  | 200SGL1083-2   | . QAD KIT                    | 1                    | G,I,K,P,R,U,W,X,<br>AD, AF           |
| 4-1-                  | 200SGL1083-3   | . QAD KIT                    | 1                    | B                                    |
| 4-1-1                 | 200SGL1040     | . . MOUNTING FLANGE          | 1                    | A,D,H,J,M,N,O,Q,S,<br>AC             |
| 4-1-1                 | 200SGL1040-1   | . . MOUNTING FLANGE          | 1                    | C,E,F                                |
| 4-1-1                 | 200SGL1040-2   | . . MOUNTING FLANGE          | 1                    | G,I,K,P,R,U,AF,W                     |
| 4-1-1                 | 200SGL1040-3   | . . MOUNTING FLANGE          | 1                    | B                                    |
| 4-1-1                 | 200SGL1040-5   | . . MOUNTING FLANGE          | 1                    | L,Y                                  |
| 4-1-2                 | 150SG1108      | . . CLAMP, RING              | 1                    | ALL except L                         |
| 4-1-3                 | M83248/1-113   | . "O" RING                   | 1                    | A,D,G,H,I,J,K,M,N,<br>O,P,Q,S,T,U,AF |
| 4-1-4                 | MS16624-4066   | . RING, RETAINING.           | 1                    | ALL                                  |
| 4-1-5                 | 150SG1017      | . DISC, BAFFLE               | 2                    | ALL                                  |



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| FIG &<br>INDEX<br>NO. | PART<br>NUMBER | DESCRIPTION<br>1 2 3 4 5 6 7 | UNITS<br>PER<br>ASSY | USAGE<br>CODE                               |
|-----------------------|----------------|------------------------------|----------------------|---------------------------------------------|
| 4-1-6                 | 150SG1052-14   | . BEARING, BALL              | 2                    | A,B,C,D,E,F,G,I,L,M,N,<br>P,R,T,V,W,X,AD,AF |
| 4-1-6                 | 150SG1052-14   | . BEARING, BALL, DRIVE END   | 1                    | H,K,U,AA                                    |
| 4-1-6A                | 200SGL1052-7   | . BEARING, BALL, A DRIVE END | 1                    | H,K,U,AA                                    |
| 4-1-6A                | 200SGL1052-5   | . BEARING, BALL, DRIVE END   | 1                    | AB                                          |
| 4-1-6                 | 150SG1052-1    | . BEARING BALL, A DRIVE END  | 1                    | AB                                          |
| 4-1-6                 | 150SG1052-1    | . BEARING BALL               | 2                    | J,Q,V,Y,Z,AC,AE                             |
| 4-1-6                 | 150SG1052-10   | . BEARING BALL               | 2                    | O,S                                         |
| 4-1-7                 | 200SGL1103     | . SHAFT, DRIVE ASSY          | 1                    | A,D,T                                       |
| 4-1-7                 | 200SGL1103-1   | . SHAFT, DRIVE ASSY          | 1                    | C,E,F                                       |
| 4-1-7                 | 200SGL1103-2   | . SHAFT, DRIVE ASSY          | 1                    | B,R                                         |
| 4-1-7                 | 200SGL1103-3   | . SHAFT, DRIVE ASSY          | 1                    | G,I,P,W,X,AD,AF                             |
| 4-1-7                 | 200SGL1103-5   | . SHAFT, DRIVE ASSY          | 1                    | H                                           |
| 4-1-7                 | 200SGL1103-9   | . SHAFT, DRIVE ASSY          | 1                    | K                                           |
| 4-1-7                 | 200SGL1103-10  | . SHAFT, DRIVE ASSY          | 1                    | L                                           |
| 4-1-7                 | 200SGL1103-11  | . SHAFT, DRIVE ASSY          | 1                    | J,Q,R,Z,AC                                  |
| 4-1-7                 | 200SGL1103-13  | . SHAFT, DRIVE ASSY          | 1                    | O,S                                         |
| 4-1-7                 | 200SGL1103-17  | . SHAFT, DRIVE ASSY          | 1                    | M,N                                         |
| 4-1-7                 | 200SGL1103-18  | . SHAFT, DRIVE ASSY          | 1                    | U,AA,AB                                     |



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| FIG &<br>INDEX<br>NO. | PART<br>NUMBER | DESCRIPTION<br>1 2 3 4 5 6 7 | UNITS<br>PER<br>ASSY | USAGE<br>CODE                           |
|-----------------------|----------------|------------------------------|----------------------|-----------------------------------------|
| 4-1-7                 | 200SGL1103-19  | . SHAFT, DRIVE ASSY          | 1                    | AE                                      |
| 4-1-7                 | 200SGL1103-21  | . SHAFT, DRIVE ASSY          | 1                    | Y                                       |
| 4-1-8                 | 150SG1070      | . FRICTION RING              | 1                    | ALL except P                            |
| 4-1-8                 | 200SGL1070     | . FRICTION RING              | 1                    | P,AF                                    |
| 4-1-9                 | 150SG1073      | . PLATE DAMPENER             | 1                    | ALL except P                            |
| 4-1-9                 | 200SGL1073     | . PLATE DAMPENER             | 1                    | P,AF                                    |
| 4-1-                  | 200SGL1301-1   | . HSG & SCREEN ASSY DE       | 1                    | A,C,D,E,F,H,J,M,N,O<br>,Q,S,T,V,Z,AC,AE |
| 4-1-                  | 200SGL1301-2   | . HSG & SCREEN ASSY DE       | 1                    | B,G,I,K,P,R,U, W<br>AA,AB,AD,AF         |
| 4-1-                  | 200SGL1301-3   | . HSG & SCREEN ASSY DE       | 1                    | L,Y                                     |
| 4-1-10                | 200SGL1028-1   | . . BELL, END DRIVE          | 1                    | A,C,D,E,F,H,J,M,N,O<br>,Q,S,T,V,Z,AC,AE |
| 4-1-10                | 200SGL1028-2   | . . BELL, END DRIVE          | 1                    | B,G,I,K,P,R,U,<br>W,X,AA,AB,AD,AF       |
| 4-1-10                | 200SGL1028-3   | . . BELL, END DRIVE          | 1                    | L,Y                                     |
| 4-1-11                | 150SG1004-1    | . . SCREEN                   | 1                    | ALL                                     |
| 4-1-12                | 250SG1302      | . . WASHER, SCREEN           | 6                    | ALL                                     |
| 4-1-13                | MS21318-14     | . . DRIVE SCREW              | 6                    | ALL                                     |
| 4-2-14                | MS35489-1      | . . GROMMET                  | 1                    | B,G,I,K,P,R,U,AF,<br>W                  |
| 4-1-15                | 150SG1106      | . SCREW, MTG. HEAD           | 8                    | ALL except L                            |
| 4-1-15                | 150SG1106-1    | . SCREW, MTG. HEAD           | 8                    | L                                       |



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| FIG &<br>INDEX<br>NO. | PART<br>NUMBER | DESCRIPTION<br>1 2 3 4 5 6 7          | UNITS<br>PER<br>ASSY | USAGE<br>CODE                         |
|-----------------------|----------------|---------------------------------------|----------------------|---------------------------------------|
| 4-1-16                | 150SG1379-8    | . WASHER, LOCK                        | 8                    | ALL                                   |
| 4-1-17                | 150SG1113      | . WASHER, FLAT                        | 8                    | ALL except L                          |
| 4-1-17                | 250SG1113      | . WASHER, FLAT                        | 8                    | L                                     |
| 4-2-18                | 200SGL1219-1   | . SPUR GEAR                           | 1                    | G,K,P,U,W,X,W,X,<br>AA,AB,AD,AF       |
| 4-1-                  | 200SGL1126     | . STATOR & TERMINAL BLOCK<br>ASSEMBLY | 1                    | A,C,D,E,H,L,M,O,S<br>,T               |
| 4-2-                  | 200SGL1126-1   | . STATOR & TERMINAL BLOCK<br>ASSEMBLY | 1                    | G,P,AF                                |
| 4-2-                  | 200SGL1126-2   | . STATOR & TERMINAL BLOCK<br>ASSEMBLY | 1                    | B                                     |
| 4-2-                  | 200SGL1126-3   | . STATOR & TERMINAL BLOCK<br>ASSEMBLY | 1                    | F,N                                   |
| 4-2-                  | 200SGL1126-4   | . STATOR & TERMINAL BLOCK<br>ASSEMBLY | 1                    | I                                     |
| 4-2-                  | 200SGL1126-5   | . STATOR & TERMINAL BLOCK<br>ASSEMBLY | 1                    | K,U                                   |
| 4-1-                  | 200SGL1126-6   | . STATOR & TERMINAL BLOCK<br>ASSEMBLY | 1                    | J,Q                                   |
| 4-1-19                | 200SGL1156     | . . STATOR ASSY                       | 1                    | A,C,D,E,H,J,L,M,O,<br>Q,S,T,V,Z,AC,AE |
| 4-2-19B               | 200SGL1156-1   | . . STATOR ASSY                       | 1                    | F,N,Y                                 |
| 4-2-19C               | 200SGL1156-2   | . . STATOR ASSY                       | 1                    | B                                     |
| 4-2-19C               | 200SGL1156-4   | . . STATOR ASSY                       | 1                    | I                                     |



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| FIG &<br>INDEX<br>NO. | PART<br>NUMBER | DESCRIPTION<br>1 2 3 4 5 6 7 | UNITS<br>PER<br>ASSY | USAGE<br>CODE                           |
|-----------------------|----------------|------------------------------|----------------------|-----------------------------------------|
| 4-2-19C               | 200SGL1156-6   | . . STATOR ASSY              | 1                    | K,U,AA,AB                               |
| 4-2-19D               | 200SGL1156-5   | . . STATOR ASSY              | 1                    | G,P,<br>W,X,AD,AF,W                     |
| 4-2-19C               | 200SGL1156-7   | . . STATOR ASSY              | 1                    | R                                       |
| 4-1-20                | 200SGL1061     | . . TERMINAL BLOCK, AXIAL    | 1                    | A,C,D,E,H,L,M,O,S<br>,T                 |
| 4-1-20                | 200SGL1061-4   | . . TERMINAL BLOCK, AXIAL    | 1                    | J,Q,V,Z,AC,AE                           |
| 4-2-21                | 200SGL1061-3   | . . TERMINAL BLOCK, AXIAL    | 1                    | B,F,I,K,N,R,U,Y,AA,<br>AB               |
| 4-2-22                | 200SGL1061-2   | . . TERMINAL BLOCK, RADIAL   | 1                    | G,P, W,X,AD,AF                          |
| 4-2-24                | 200SGL1318     | . . COVER TERMINAL BLOCK     | 1                    | G,P,AD,AF,W                             |
| 4-2-25                | NAS1189-06P12B | . . SCREW, COVER, TERM BLK   | 2                    | G,P,W,AD,AF                             |
| 4-1-26                | 150SG1389-6    | . . . NUT, TERMINAL BLOCK    | 3                    | A,C,D,E,H,J,L,M,O,<br>Q,S,T,V,Z,AC,AE   |
| 4-2-26                | 150SG1389-6    | . . . NUT, TERMINAL BLOCK    | 2                    | B,F,G,I,K,N,R,P,U,W,<br>X,Y,AA,AB,AD,AF |
| 4-1-27                | AN960C616      | . . . WASHER, TERM. BLOCK    | 3                    | A,C,D,E,H,J,L,M,O,<br>Q,S,T,V,Z,AC,AE   |
| 4-2-27                | AN960C616      | . . . WASHER, TERM. BLOCK    | 2                    | B,F,G,I,K,N,P,R,U,W,<br>X,Y,AA,AB,AD,AF |
| 4-1-28                | 150SG1389-3    | . . . NUT, TERMINAL BLOCK    | 2                    | A,C,D,E,H,J,L,M,O,<br>Q,S,T,V,Z,AC,AE   |
| 4-2-28                | 150SG1389-3    | . . . NUT, TERMINAL BLOCK    | 2                    | B,F,G,I,K,N,P,R,U,W,<br>X,Y,AA,AB,AD,AF |
| 4-1-29                | AN960C10       | . . . WASHER, TERM BLOCK     | 2                    | A,C,D,E,H,J,L,M,O,<br>Q,S,T,VZ,AB,AE    |
| 4-2-29                | AN960C10       | . . . WASHER, TERM BLOCK     | 2                    | B,F,G,I,K,N,P,R,U,W,<br>X,Y,AA,AB,AD,AF |
| 4-1-30                | MS35265-65     | . . SCREW, TERM. BLOCK MTG,  | 2                    | A,C,D,E,H,J,L,M,O,<br>Q,S,T,V,Z,AC,AE   |



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| FIG &<br>INDEX<br>NO. | PART<br>NUMBER | DESCRIPTION<br>1 2 3 4 5 6 7  | UNITS<br>PER<br>ASSY | USAGE<br>CODE                           |
|-----------------------|----------------|-------------------------------|----------------------|-----------------------------------------|
| 4-2-30                | MS35265-65     | . . SCREW, TERM. BLOCK MTG.   | 2                    | B,F,G,I,K,N,P,R,U,W,<br>X,Y,AA,AB,AD,AF |
| 4-1-31                | MS35338-43     | . . WASHER, LOCK TERM. BLOCK  | 2                    | A,C,D,E,H,J,L,M,O,<br>Q,S,T,V,Z,AC,AE   |
| 4-2-31                | MS35338-43     | . . WASHER, LOCK TERM. BLOCK  | 2                    | B,F,G,I,K,N,P,R,U,W,<br>X,Y,AA,AB,AD,AF |
| 4-1-32                | AN960-10L      | . . WASHER, FLAT, TERM. BLOCK | 2                    | A,C,D,E,H,J,L,M,O,<br>Q,S,T,V,Z,AB,AE   |
| 4-2-32                | AN960-10L      | . . WASHER, FLAT, TERM. BLOCK | 2                    | B,F,G,I,K,N,P,R,U,W,<br>X,Y,AA,AB,AD,AF |
| 4-2-33                | MS3112E8-3P    | . . CONNECTOR                 | 1                    | B,G,I,K,P,R,U,AD,<br>W,X,AA,AB,AF       |
| 4-2-34                | 200SG1221      | . . SPACER, CONNECTOR         | 1                    | B,G,I,K,P,R,U,AD,<br>W,X,AA,AB,AF       |
| 4-2-35                | 300SG1222-2    | . . MAGNETIC PICK-UP          | 1                    | G,K,P,U,W,X,AA,<br>AB,AD,AF             |
| 4-2-35A               | MS35266-59     | SCREW, CLAMP                  | 1                    | G,K,P,U,W,X,AA,<br>AB,AD,AF             |
| 4-2-35B               | 400SG1237      | CLAMP                         | 1                    | G,K,P,U,W,X,AA,<br>AB,AD,AF             |
| 4-2-36                | MS35265-19     | . . SCREW, CONNECTOR          | 4                    | B,G,I,K,P,R,U,W,X,<br>AA,AB,AD,AF       |
|                       |                |                               |                      |                                         |
| 4-1-37                | 200SGL1092     | . . NAMEPLATE                 | 1                    | A                                       |
| 4-1-37                | 200SGL1092-1   | . . NAMEPLATE                 | 1                    | B                                       |
| 4-1-37                | 200SGL1092-2   | . . NAMEPLATE                 | 1                    | C                                       |
| 4-1-37                | *200SGL1092-3  | . . NAMEPLATE                 | 1                    | D                                       |
| 4-1-37                | 200SGL1092-4   | . . NAMEPLATE                 | 1                    | E                                       |
| 4-1-37                | 200SGL1092-5   | . . NAMEPLATE                 | 1                    | F                                       |
| 4-1-37                | 200SGL1092-6   | . . NAMEPLATE (non-XL)        | 1                    | G                                       |
| 4-1-37                | 200SGL1092-38  | . . NAMEPLATE (XL)            | 1                    | G                                       |
| 4-1-37                | 200SGL1092-7   | . . NAMEPLATE                 | 1                    | H                                       |
| 4-1-37                | 200SGL1092-10  | . . NAMEPLATE                 | 1                    | I                                       |
| 4-1-37                | 200SGL1092-12  | . . NAMEPLATE                 | 1                    | J                                       |

\*Standard Model Label Shown. Consult factory for specific customer identification requirements.



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| FIG &<br>INDEX<br>NO. | PART<br>NUMBER | DESCRIPTION<br>1 2 3 4 5 6 7   | UNITS<br>PER<br>ASSY | USAGE<br>CODE |
|-----------------------|----------------|--------------------------------|----------------------|---------------|
| 4-1-37                | 200SGL1092-16  | . . NAMEPLATE                  | 1                    | K             |
| 4-1-37                | 200SGL1092-17  | . . NAMEPLATE                  | 1                    | L             |
| 4-1-37                | 200SGL1092-44  | . . NAMEPLATE                  | 1                    | M             |
| 4-1-37                | 200SGL1092-49  | . . NAMEPLATE                  | 1                    | N             |
| 4-1-37                | 200SGL1092- 41 | . . NAMEPLATE (Screw Mount)    | 1                    | O             |
| 4-1-37                | 200SGL1092- 42 | . . NAMEPLATE (Adhesive Mount) | 1                    | O             |
| 4-1-37                | 200SGL1092-51  | . . NAMEPLATE                  | 1                    | P             |
| 4-1-37                | 200SGL1092- 29 | . . NAMEPLATE                  | 1                    | Q             |
| 4-1-37                | 200SGL1092-37  | . . NAMEPLATE                  | 1                    | R             |
| 4-1-37                | 200SGL1092- 43 | . . NAMEPLATE (Screw Mount)    | 1                    | S             |
| 4-1-37                | 200SGL1092- 46 | . . NAMEPLATE (Adhesive Mount) | 1                    |               |
| 4-1-37                | 200SGL1092-47  | . . NAMEPLATE                  | 1                    | T             |
| 4-1-37                | 200SGL1092-50  | . . NAMEPLATE                  | 1                    | U             |
| 4-1-37                | 200SGL1092-59  | . . NAMEPLATE                  | 1                    | V             |
| 4-1-37                | 200SGL1092-28  | . . NAMEPLATE                  | 1                    | W             |
| 4-1-37                | 200SGL1092-53  | . . NAMEPLATE                  | 1                    | X             |
| 4-1-37                | 200SGL1092-63  | . . NAMEPLATE                  | 1                    | Y             |
| 4-1-37                | 200SGL1092-64  | . . NAMEPLATE                  | 1                    | Z             |
| 4-1-37                | 200SGL1092-57  | . . NAMEPLATE                  | 1                    | AA            |
| 4-1-37                | 200SGL1092-67  | . . NAMEPLATE                  | 1                    | AC            |
| 4-1-37                | 200SGL1092-72  | . . NAMEPLATE                  | 1                    | AB            |
| 4-1-37                | 200SGL1092-75  | . . NAMEPLATE                  | 1                    | AD            |
| 4-1-37                | 200SGL1092-56  | . . NAMEPLATE                  | 1                    | AE            |
| 4-1-37                | 200SGL1092-76S | . . NAMEPLATE                  | 1                    | AF            |
| 4-1-38                | MS21318-13     | . . SCREW, NAMEPLATE           | 4                    | ALL           |
| 4-1-39                | 150SG1139      | . . DECAL, HI-POT WARNING      | 1                    | ALL           |
| 4-1-40                | 150SG1168      | . . DECAL, QAD WARNING         | 1                    | ALL           |
|                       |                |                                |                      |               |



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| FIG &<br>INDEX<br>NO. | PART<br>NUMBER  | DESCRIPTION<br>1 2 3 4 5 6 7 | UNITS<br>PER<br>ASSY | USAGE<br>CODE                                   |
|-----------------------|-----------------|------------------------------|----------------------|-------------------------------------------------|
| 4-1-40A               | 200SGL1360S     | . . SAI-XL LABEL             | 1                    | XL MODELS ONLY                                  |
| 4-1-40A               | 200SGL1360-1S   | . . SAI-XL2 LABEL            | 1                    | XL2 MODELS ONLY                                 |
| 4-2-40B               | 200SGL1381      | . . DECAL, FAN COVER         | 1                    | S                                               |
| 4-2-40C               | 400SG1380       | DECAL, MODIFICATION STATUS   | 1                    | As req'd                                        |
| 4-1-41                | 200SGL1006      | . RETAINER, BEARING          | 1                    | ALL EXCEPT H,K,U                                |
| 4-1-41A               | 200SGL1006-1    | . RETAINER, BEARING          | 1                    | H,K,U                                           |
| 4-1-42                | 150SG1379-8     | . WASHER, LOCK               | 4                    | ALL EXCEPT H,K,U                                |
| 4-1-43                | AN500A8-8       | . SCREW, BEARING RETAINER    | 4                    | ALL EXCEPT H,K,U                                |
| 4-1-43A               | MS24694-S5      | . SCREW, BEARING RETAINER    | 4                    | H,K,U                                           |
| 4-1-44                | 200SGL1064      | . ARMATURE ASSY              | 1                    | A,C,D,E,F,J,L,M,N,O,S,T<br>,AE                  |
| 4-1-44                | 200SGL1064-1    | . ARMATURE ASSY              | 1                    | B,G,I,P,R,W,X,AF                                |
| 4-1-44                | 200SGL1064-2    | . ARMATURE ASSY              | 1                    | H                                               |
| 4-1-44                | 200SGL1064-5    | . ARMATURE ASSY              | 1                    | K                                               |
| 4-1-44*               | 200SGL1064-XL   | . ARMATURE ASSY              | 1                    | Q,V,Y,Z,AC                                      |
| 4-1-44*               | 200SGL1064-1-XL | . ARMATURE ASSY              | 1                    | AD                                              |
| 4-1-44*               | 200SGL1064-5-XL | . ARMATURE ASSY              | 1                    | U,AA,AB                                         |
| 4-1-45                | 200SGL1107      | . FAN ASSY                   | 1                    | A,B,C,D,E,F,G,H,I,J,K,L,<br>M,N,P,R,T,W,X,AD,AF |

**\*NOTE: “-XL” armature assemblies are considered interchangeable with non “-XL” armature assemblies.**



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| FIG &<br>INDEX<br>NO.       | PART<br>NUMBER | DESCRIPTION<br>1 2 3 4 5 6 7  | UNITS<br>PER<br>ASSY | USAGE<br>CODE        |
|-----------------------------|----------------|-------------------------------|----------------------|----------------------|
| 4-1-45                      | 200SGL1107-2   | . FAN ASSY                    | 1                    | O,Q,S,V,Y,AC,AE      |
| 4-1-45                      | 200SGL1107-4   | . FAN ASSY                    | 1                    | U                    |
| 4-1-45                      | 200SGL1107-5   | . FAN ASSY                    | 1                    | Z                    |
| 4-1-46                      | 200SGL1093     | . SPRING, BELLEVILLE          | 2                    | ALL except G,P,AD,AF |
| 4-1-46                      | 250SG1093      | . SPRING, BELLEVILLE          | 3                    | G,P,AD,AF            |
|                             |                |                               |                      |                      |
| 4-1-47                      | 150SG1071      | . NUT, SELF LOCKING           | 1                    | ALL                  |
| 4-1-48                      | 200SGL1153     | . COMM. END BELL ASSY         | 1                    | ALL                  |
| 4-1-48                      | 200SGL1153-2   | . COMM. END BELL ASSY         | 1                    | Y,Z                  |
| 4-1-49                      | 150SG1105      | . SCREW, COMM. HEAD MTG.      | 8                    | ALL                  |
| 4-1-50                      | 150SG1379-8    | . WASHER, LOCK, COMM HEAD MTG | 8                    | ALL                  |
| 4-1-51                      | 250SG1113      | . WASHER, FLAT, COMM HEAD MTG | 8                    | ALL                  |
| 4-2-52A<br>4-2-57<br>4-2-58 | 200SGL1014-8   | . AIR INLET KIT ASSY          | 1                    | S                    |
| 4-1-52                      | 150SG1014      | . COVER ASSY, FAN             | 1                    | A,J,L,M              |
| 4-2-52A                     | 200SGL1014-1   | . COVER ASSY, FAN             | 1                    | H                    |
| 4-1-52                      | 150SG1014-2    | . COVER ASSY, FAN             | 1                    | AD                   |
| 4-1-52                      | 200SGL1014-4   | . COVER ASSY, FAN             | 1                    | K                    |
| 4-1-52                      | 200SGL1014-5   | . COVER ASSY, FAN             | 1                    | Q,AE                 |



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| FIG &<br>INDEX<br>NO. | PART<br>NUMBER | DESCRIPTION<br>1 2 3 4 5 6 7       | UNITS<br>PER<br>ASSY | USAGE<br>CODE                            |
|-----------------------|----------------|------------------------------------|----------------------|------------------------------------------|
| 4-2-52A               | 200SGL1014-6   | . COVER ASSY, FAN                  | 1                    | S                                        |
| 4-1-52                | 200SGL1014-14  | . COVER ASSY, FAN                  | 1                    | U                                        |
| 4-2-52A               | 200SGL1014-18  | . COVER ASSY, FAN                  | 1                    | Y                                        |
| 4-1-54                | 200SGL1011     | . COVER ASSY, FAN                  | 1                    | D,E,G,N,O,P,W,AF                         |
| 4-1-53                | 200SGL1011-1   | . COVER ASSY, FAN                  | 1                    | B,C,F                                    |
| 4-2-56                | 200SGL1011-8   | . COVER ASSY, FAN                  | 1                    | I,R,T                                    |
| 4-1-53                | 200SGL1011-14  | . COVER ASSY, FAN                  | 1                    | X                                        |
| 4-1-53                | 200SGL1011-15  | . COVER ASSY, FAN                  | 1                    | AA,AB                                    |
| 4-1-53                | 200SGL1011-17  | . COVER ASSY, FAN                  | 1                    | Z                                        |
| 4-1-55                | 250SG1116      | . SCREW, FAN COVER                 | 4                    | A,B,C,D,E,F,G,J,K,L,<br>M,N,O,P,Q,U,W,AF |
| 4-2-55                | 250SG1116      | . SCREW, FAN COVER                 | 4                    | H,I,R,S,T                                |
| 4-2-57                | 150SG1108      | . CLAMP                            | 1                    | H,S                                      |
| 4-2-57                | 200SG1108      | CLAMP                              | 1                    | AD                                       |
| 4-2-58                | 200SGL1014-7   | . AIR INLET, RADIAL                | 1                    | S                                        |
| 4-2-58                | 200SGL1011-7   | . AIR INLET, RADIAL                | 1                    | H                                        |
| 4-3-                  | 200SGL1138     | . . HOLDER ASSY, BRUSH &<br>SPRING | 4                    | ALL<br>(except V, Z, AC)                 |
| 4-3-                  | 200SGL1138-1   | . . HOLDER ASSY, BRUSH &<br>SPRING | 4                    | V, Z, AC                                 |



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| FIG &<br>INDEX<br>NO. | PART<br>NUMBER | DESCRIPTION<br>1 2 3 4 5 6 7                    | UNITS<br>PER<br>ASSY | USAGE<br>CODE                                         |
|-----------------------|----------------|-------------------------------------------------|----------------------|-------------------------------------------------------|
| 4-3-1                 | 200SGL1154     | . . . HOLDER, BRUSH                             | 4                    | ALL<br>(except V, Z, AC)                              |
| 4-3-1                 | 200SGL1154-3   | . . . HOLDER, BRUSH                             | 4                    | V, Z, AC                                              |
| 4-3-2                 | 200SGL1005     | . . . SPRING                                    | 8                    | ALL                                                   |
| 4-3-3                 | 200SGL1057     | . . P.C. BOARD ASSY.                            | 2                    | ALL                                                   |
| 4-3-4                 | 200SGL1008-1   | . . HEAD, COMMUTATOR<br>(Supersedes 200SGL1008) | 1                    | ALL                                                   |
| 4-3-5                 | 150SG1112-1    | . . SCREW BRUSH HOLDER                          | 8                    | ALL                                                   |
| 4-3-6                 | AN960-10L      | . . WASHER, PLAIN                               | 16                   | ALL                                                   |
| 4-3-7                 | 150SG1045      | . . TUBE, INSULATOR                             | 8                    | ALL                                                   |
| 4-3-8                 | 150SG1046      | . . WASHER, INSULATOR BR. BOX                   | 8                    | ALL                                                   |
| 4-3-9                 | 150SG1114      | . . WASHER, INSULATOR                           | 4                    | ALL                                                   |
| 4-3-10                | 150SG1389-3    | . . NUT, SELF LOCKING                           | 8                    | ALL                                                   |
| 4-3-11                | 200SGL1009     | . . BRUSH (non-XL)                              | 4                    | A,B,C,D,E,F,G,H,I,J,K,L<br>,M,N,O,P,Q,R,S,T,U,W,<br>X |
| *4-3-11               | 200SGL1009-3   | . . BRUSH, XL                                   | 4                    | A,D,F,G,K,L,O,R,U,<br>W,P                             |
| *4-3-11               | 200SGL1009-5   | . . BRUSH, XL2                                  | 4                    | AD                                                    |
| *4-3-11               | 200SGL1009-7   | . . BRUSH, XL2                                  | 4                    | AF                                                    |

\* To verify type of starter generator, see nameplate on unit for “XL” or “XL2” designation.



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| FIG &<br>INDEX<br>NO. | PART<br>NUMBER  | DESCRIPTION<br>1 2 3 4 5 6 7 | UNITS<br>PER<br>ASSY | USAGE<br>CODE                                     |
|-----------------------|-----------------|------------------------------|----------------------|---------------------------------------------------|
| *4-3-11               | 200SGL1009-10X2 | . . BRUSH, XL2               | 4                    | A,D,E,F,J,K,L,N,Q,R,<br>S,U,V,Y,Z,AA,AB,AC,<br>AE |
| 4-3-12                | 200SG1020       | . . SCREW, BRUSH MOUNTING    | 4                    | ALL                                               |
|                       |                 |                              |                      |                                                   |
|                       |                 |                              |                      |                                                   |
|                       |                 |                              |                      |                                                   |
|                       |                 |                              |                      |                                                   |
|                       |                 |                              |                      |                                                   |
|                       |                 |                              |                      |                                                   |
|                       |                 |                              |                      |                                                   |
|                       |                 |                              |                      |                                                   |
|                       |                 |                              |                      |                                                   |
|                       |                 |                              |                      |                                                   |
|                       |                 |                              |                      |                                                   |
|                       |                 |                              |                      |                                                   |
|                       |                 |                              |                      |                                                   |



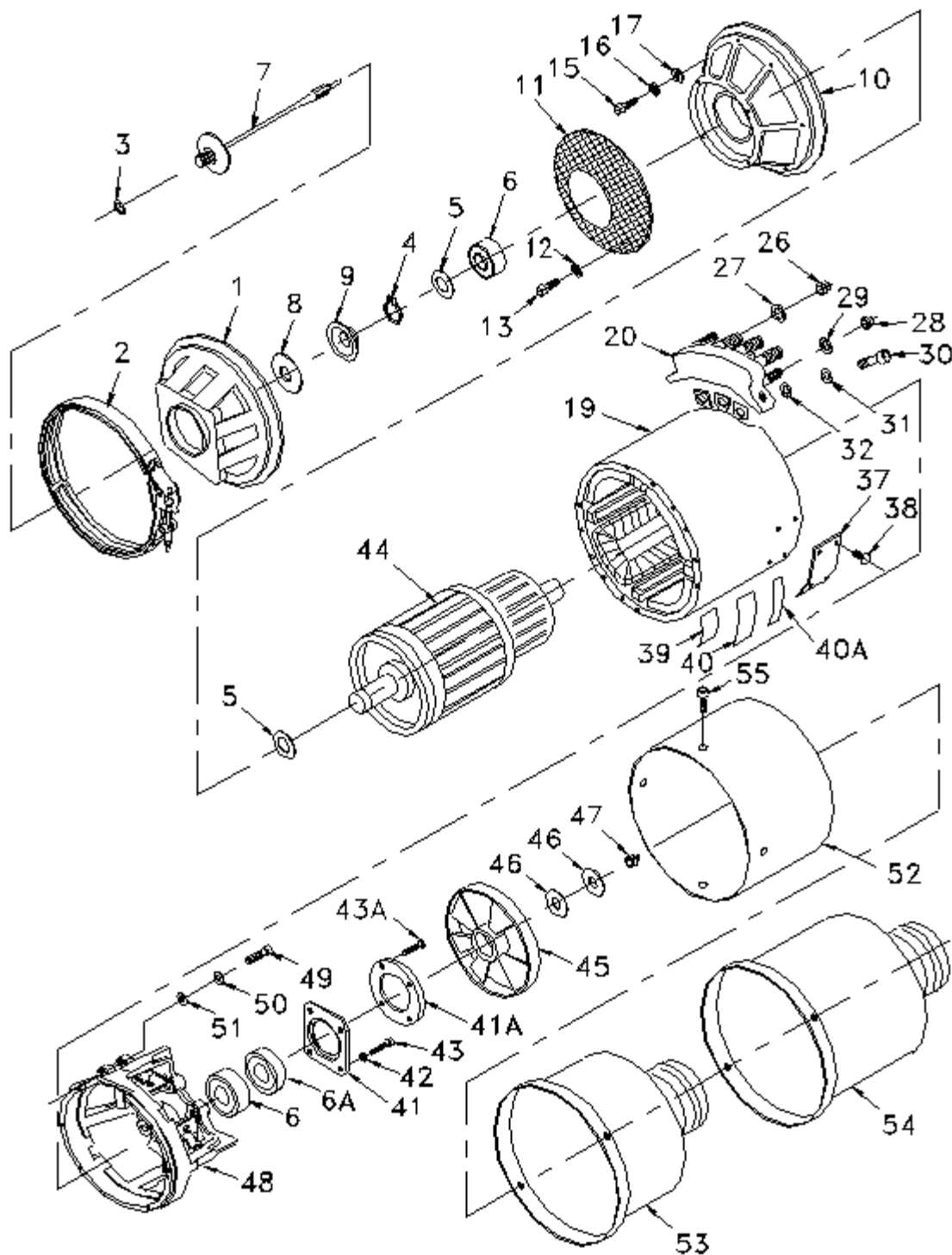
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USAGE CODE "K" APPLIES TO THE FOLLOWING MODELS, EXCEPT AS INDICATED BELOW. ALL OTHER PARTS ARE INDENTICAL TO USAGE CODE "K"

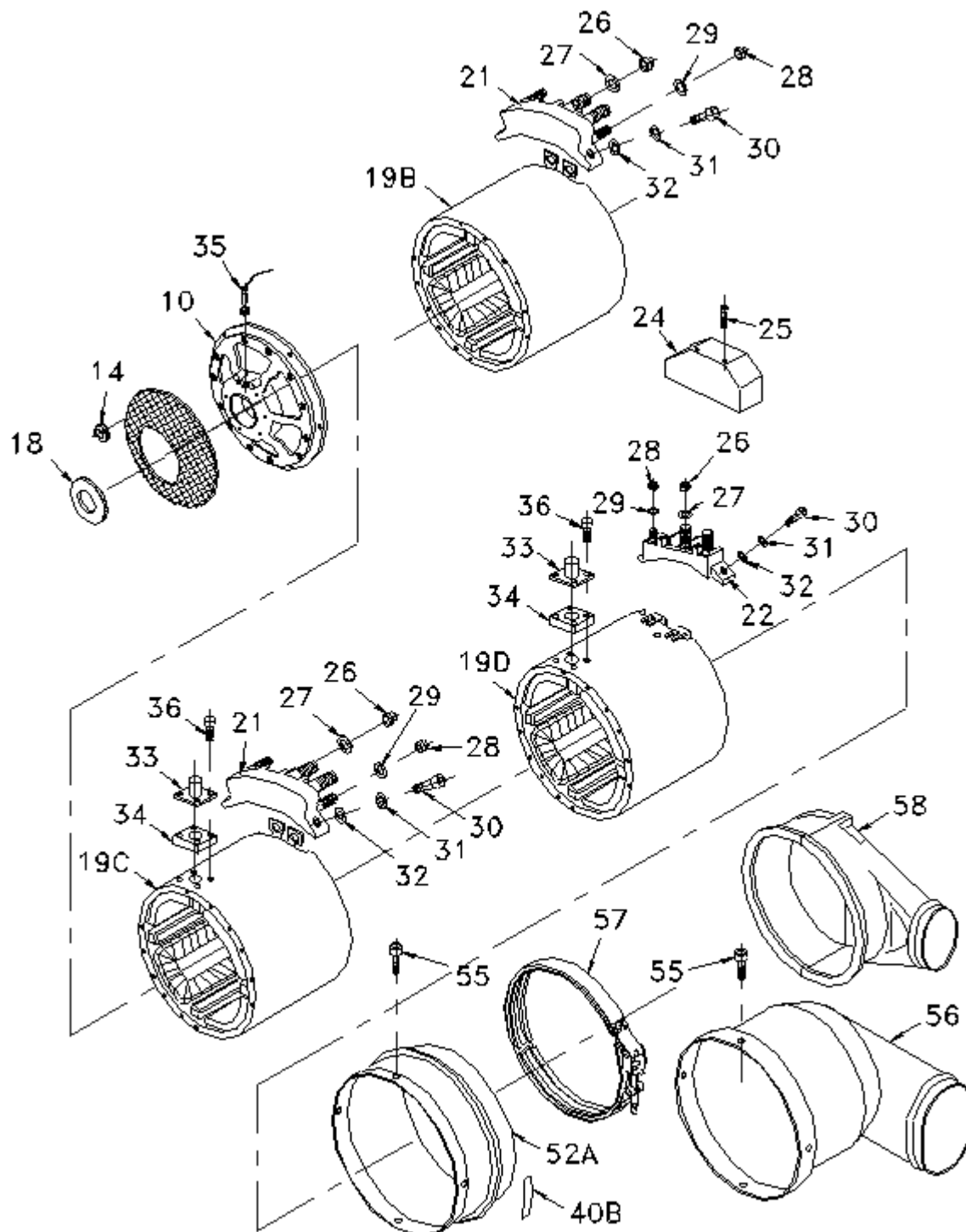
| MODEL         | FIG & INDEX NO. |            |              |              |
|---------------|-----------------|------------|--------------|--------------|
|               | 4-1-37          | 4-1-54     | 4-1-         | 4-1-1        |
| 200SGL129Q(1) | 200SGL1092-24   | 200SGL1011 | -            | -            |
| 200SGL129Q(3) | 200SGL1092-25S  | -          | -            | 200SGL1040-3 |
| 200SGL129Q(5) | 200SGL1092-27   | 200SGL1011 | 200SGL1083-3 | 200SGL1040-3 |
| 200SGL129Q(8) | 200SGL1092-39   | -          | 200SGL1083-3 | 200SGL1040-3 |
| 200SGL129Q(4) | 200SGL1092-26   | -          | 200SGL1083-3 | 200SGL1040-3 |

| MODEL         | FIG & INDEX NO. |                  |              |  |
|---------------|-----------------|------------------|--------------|--|
|               | 4-3-11          | 4-1-44           | 4-2-19C      |  |
| 200SGL129Q(1) | 200SGL1009-3    | 200SGL1064-5-XL* | -            |  |
| 200SGL129Q(3) | 200SGL1009-3    | 200SGL1064-5-XL* | -            |  |
| 200SGL129Q(5) | 200SGL1009-3    | 200SGL1064-5-XL* | -            |  |
| 200SGL129Q(8) | -               | -                | 200SGL1156-4 |  |
| 200SGL129Q(4) | -               | -                | -            |  |

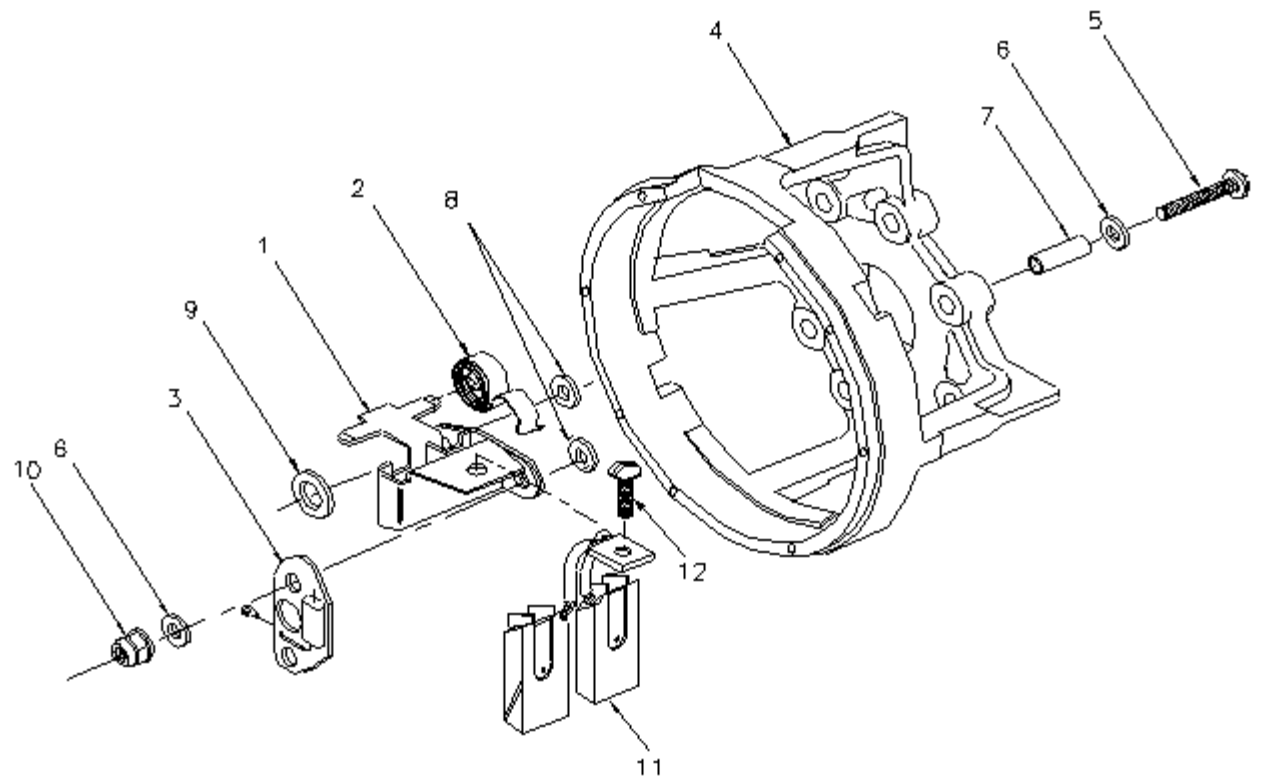
**\*Note: "XL armatures are considered interchangeable with non XL armatures.**



**FIGURE 4-1**  
**ILLUSTRATED PARTS BREAKDOWN- STARTER GENERATOR**



**FIGURE 4-2**  
**ILLUSTRATED PARTS BREAKDOWN- MODEL DIFFERENCES**



**FIGURE 4-3**  
**ILLUSTRATED PARTS BREAKDOWN- BELL ASSY, COMMUTATOR END**



## SECTION V MODEL DIFFERENCE DATA SHEET INDEX

The instructions contained in the preceding sections of this manual apply to the following additional models.

|                                                                                |      |
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## SECTION V

### MODEL DIFFERENCE DATA SHEET INDEX (Continued)

The instructions contained in the preceding sections of this manual apply to the following additional models.

|                     |      |
|---------------------|------|
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## DIFFERENCE DATA SHEETS

### STARTER-GENERATOR

200SGL112Q

The basic parts differences between Models 200SGL111Q and 200SGL112Q is the Drive Shaft, Stator, Terminal Block, Armature, Drive End Bell, QAD Housing and Air Blast Cover.

Model 200SGL112Q is a shunt start generator using a speed sensor and spur gear. The QAD conforms to AND10261-11B.

#### DESCRIPTION AND OPERATION

Same as for Model 200SGL111Q

#### DISASSEMBLY AND ASSEMBLY

Same as for Model 200SGL111Q,  
except as follows:  
Magnetic Pickup and Spur Gear  
(See Page 6-2)  
Terminal Block and Generator Wiring  
Diagram (See Fig. 6-4)

#### REPAIR & REPLACEMENT

Same as for Model 200SGL111Q

#### TESTING

Same as for Model 200SGL111Q,  
except as follows:  
Schematic Hook up Starter Test  
(See Fig. 6-3)  
Equalizing Voltage Test (See Fig. 3-4)  
Speed pick up Test (See Page 6-4)  
Acceleration Run (See Page 6-5)

#### ILLUSTRATED PARTS LIST

Same as for Model 200SGL111Q,  
except variations as noted by  
Usage Code Symbols



## DIFFERENCE DATA SHEETS

|                          |                   |
|--------------------------|-------------------|
| <b>STARTER-GENERATOR</b> | <b>200SGL114Q</b> |
|--------------------------|-------------------|

The basic parts differences between Models 200SGL111Q and 200SGL114Q is the Drive Shaft, QAD Housing and Air Blast Cover. The Drive Shaft and QAD Housing are designed for mounting on an engine with an AND10261-11B mounting flange.

**DESCRIPTION AND OPERATION**

Same as for Model 200SGL111Q

**DISASSEMBLY AND ASSEMBLY**

Same as for Model 200SGL111Q,

**REPAIR & REPLACEMENT**

Same as for Model 200SGL111Q

**TESTING**

Same as for Model 200SGL111Q

**ILLUSTRATED PARTS LIST**

Same as for Model 200SGL111Q,  
except variations as noted by  
Usage Code Symbols



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## DIFFERENCE DATA SHEETS

**STARTER-GENERATOR**

**200SGL115Q**

The basic parts differences between Models 200SGL111Q and 200SGL115Q is the Air Blast Cover. The QAD Housing is designed for mounting on an engine with a MS3331-1 mounting flange.

**DESCRIPTION AND OPERATION**

Same as for Model 200SGL111Q

**DISASSEMBLY AND ASSEMBLY**

Same as for Model 200SGL111Q,

**REPAIR & REPLACEMENT**

Same as for Model 200SGL111Q

**TESTING**

Same as for Model 200SGL111Q

**ILLUSTRATED PARTS LIST**

Same as for Model 200SGL111Q,  
except variations as noted by  
Usage Code Symbols



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---

## DIFFERENCE DATA SHEETS

|                          |                   |
|--------------------------|-------------------|
| <b>STARTER-GENERATOR</b> | <b>200SGL117Q</b> |
|--------------------------|-------------------|

The basic parts differences between Models 200SGL111Q and 200SGL117Q is the Air Blast Cover, Drive Shaft, and the QAD Housing. The QAD Housing is suited for mounting on an engine with AND10261-11B mounting flange.

### DESCRIPTION AND OPERATION

Same as for Model 200SGL111Q

### DISASSEMBLY AND ASSEMBLY

Same as for Model 200SGL111Q,

### REPAIR & REPLACEMENT

Same as for Model 200SGL111Q

### TESTING

Same as for Model 200SGL111Q

### ILLUSTRATED PARTS LIST

Same as for Model 200SGL111Q,  
except variations as noted by  
Usage Code Symbols



## DIFFERENCE DATA SHEETS

### STARTER-GENERATOR

200SGL118Q

The basic parts differences between Models 200SGL111Q and 200SGL118Q is the Drive Shaft, Stator, Terminal Block, QAD Housing and Air Blast Cover.

Model 200SGL118Q is a shunt start generator and has a QAD housing conforming to AND10261-11B

#### DESCRIPTION AND OPERATION

Same as for Model 200SGL111Q

#### DISASSEMBLY AND ASSEMBLY

Same as for Model 200SGL111Q,  
except as follows:  
Terminal Block and Generator Wiring  
Diagram (See Fig. 6-7)

#### REPAIR & REPLACEMENT

Same as for Model 200SGL111Q

#### TESTING

Same as for Model 200SGL111Q,  
except as follows:  
Schematic Hook up Starter Test  
(See Fig. 6-3)  
Equalizing Voltage Test (See Fig. 3-4)  
Acceleration Run (See Page 6-5)

#### ILLUSTRATED PARTS LIST

Same as for Model 200SGL111Q,  
except variations as noted by  
Usage Code Symbols



## DIFFERENCE DATA SHEETS

### STARTER-GENERATOR

200SGL119Q

The basic parts differences between Models 200SGL111Q and 200SGL119Q is the Drive Shaft, Stator, Terminal Block, Armature, Drive End Bell, QAD Housing and Air Blast Cover.

Model 200SGL119Q is a shunt start generator using a speed sensor and spur gear. The QAD conforms to MS3331-1

Model 200SGL119Q has the magnetic pick up leads wired as shown on Fig. 6-5.

Model 200SGL119Q has the improved Magnetic Speed Pick up P/N 300SG1222-2.

#### DESCRIPTION AND OPERATION

Same as for Model 200SGL111Q

#### DISASSEMBLY AND ASSEMBLY

Same as for Model 200SGL111Q,  
except as follows:  
Magnetic Pickup and Spur Gear  
(See Page 6-2)  
Terminal Block and Generator Wiring  
Diagram (See Page Fig. 6-5)  
Belleville Spring Installation  
Instructions (See Fig. 6-8)

#### REPAIR & REPLACEMENT

Same as for Model 200SGL111Q

#### TESTING

Same as for Model 200SGL111Q,  
except as follows:  
Schematic Hook up Starter Test  
(See Fig. 6-3)  
Equalizing Voltage Test (See Fig. 3-4)  
Speed pick up Test (See Page 6-4)  
Acceleration Run (See Page 6-5)

#### ILLUSTRATED PARTS LIST

Same as for Model 200SGL111Q,  
except variations as noted by  
Usage Code Symbols



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## DIFFERENCE DATA SHEETS

**STARTER-GENERATOR**

**200SGL120Q**

The basic parts differences between Models 200SGL111Q and 200SGL120Q is the Drive Shaft, Armature, Commutator Head Bearing, Bearing Retainer and Air Inlet Cover

**DESCRIPTION AND OPERATION**

Same as for Model 200SGL111Q

**DISASSEMBLY AND ASSEMBLY**

Same as for Model 200SGL111Q,

**REPAIR & REPLACEMENT**

Same as for Model 200SGL111Q

**TESTING**

Same as for Model 200SGL111Q

**ILLUSTRATED PARTS LIST**

Same as for Model 200SGL111Q,  
except variations as noted by  
Usage Code Symbols



## DIFFERENCE DATA SHEETS

|                          |                   |
|--------------------------|-------------------|
| <b>STARTER-GENERATOR</b> | <b>200SGL121Q</b> |
|--------------------------|-------------------|

The basic parts differences between Models 200SGL111Q and 200SGL121Q is the Drive Shaft, Stator, Terminal Block, Armature, Drive End Bell, QAD Housing and Air Blast Cover.

Model 200SGL121Q is a shunt start generator using a speed sensor and spur gear. The QAD conforms to MS3331-1

### DESCRIPTION AND OPERATION

Same as for Model 200SGL111Q

### DISASSEMBLY AND ASSEMBLY

Same as for Model 200SGL111Q,  
except as follows:  
Magnetic Pickup and Spur Gear  
(See Page 6-2)  
Terminal Block and Generator Wiring  
Diagram (See Fig. 6-6)

### REPAIR & REPLACEMENT

Same as for Model 200SGL111Q

### TESTING

Same as for Model 200SGL111Q,  
except as follows:  
Schematic Hook up Starter Test  
(See Fig. 6-3)  
Equalizing Voltage Test (See Fig. 3-4)  
Speed pick up Test (See Page 6-4)  
Acceleration Run (See Page 6-5)

### ILLUSTRATED PARTS LIST

Same as for Model 200SGL111Q,  
except variations as noted by  
Usage Code Symbols



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## DIFFERENCE DATA SHEETS

**STARTER-GENERATOR**

**200SGL124Q**

The basic parts differences between Models 200SGL111Q and 200SGL124Q is the Drive Shaft and Bearings.

**DESCRIPTION AND OPERATION**

Same as for Model 200SGL111Q

**DISASSEMBLY AND ASSEMBLY**

Same as for Model 200SGL111Q,

**REPAIR & REPLACEMENT**

Same as for Model 200SGL111Q

**TESTING**

Same as for Model 200SGL111Q

**ILLUSTRATED PARTS LIST**

Same as for Model 200SGL111Q,  
except variations as noted by  
Usage Code Symbols



## DIFFERENCE DATA SHEETS

|                   |               |               |
|-------------------|---------------|---------------|
| STARTER-GENERATOR | 200SGL129Q    | 200SGL129Q(1) |
|                   | 200SGL129Q(4) | 200SGL129Q(5) |
|                   |               | 200SGL129Q(8) |

The basic parts differences between Models 200SGL111Q and 200SGL129Q Series is the Drive Shaft, Stator, Terminal Block, Armature, Drive End Bell, QAD Housing, Commutator Head Bearing, Bearing Retainer and Air Blast Cover.

Model 200SGL129Q Series are shunt start generators using a speed sensor and spur gear. The QAD conforms to MS3331-1

### DESCRIPTION AND OPERATION

Same as for Model 200SGL111Q

### DISASSEMBLY AND ASSEMBLY

Same as for Model 200SGL111Q,  
except as follows:  
Magnetic Pickup and Spur Gear  
(See Page 6-2)  
Terminal Block and Generator Wiring  
Diagram (See Fig. 6-4)

### REPAIR & REPLACEMENT

Same as for Model 200SGL111Q

### TESTING

Same as for Model 200SGL111Q,  
except as follows:  
Schematic Hook up Starter Test  
(See Fig. 6-3)  
Equalizing Voltage Test (See Fig. 3-4)  
Speed pick up Test (See Page 6-4)  
Acceleration Run (See Page 6-5)

### ILLUSTRATED PARTS LIST

Same as for Model 200SGL111Q,  
except variations as noted by Usage  
Code Symbols



## DIFFERENCE DATA SHEETS

|                          |                   |
|--------------------------|-------------------|
| <b>STARTER-GENERATOR</b> | <b>200SGL130Q</b> |
|--------------------------|-------------------|

The basic parts differences between Models 200SGL111Q and 200SGL130Q is the Drive Shaft, QAD Housing, Drive End Bell, and Air Blast Cover.

The QAD Housing is designed for mounting on an engine with a NFL 34161 Mounting Flange

**DESCRIPTION AND OPERATION**

Same as for Model 200SGL111Q

**DISASSEMBLY AND ASSEMBLY**

Same as for Model 200SGL111Q,

**REPAIR & REPLACEMENT**

Same as for Model 200SGL111Q

**TESTING**

Same as for Model 200SGL111Q

**ILLUSTRATED PARTS LIST**

Same as for Model 200SGL111Q,  
except variations as noted by  
Usage Code Symbols



## DIFFERENCE DATA SHEETS

|                          |                     |
|--------------------------|---------------------|
| <b>STARTER-GENERATOR</b> | <b>200SGL111Q-2</b> |
|--------------------------|---------------------|

The basic parts differences between Models 200SGL111Q and 200SGL111Q-2 is the Drive Shaft Assembly.

The QAD Housing is designed for mounting on an engine with a MS3331-1 Mounting Flange

**DESCRIPTION AND OPERATION**

Same as for Model 200SGL111Q

**DISASSEMBLY AND ASSEMBLY**

Same as for Model 200SGL111Q

**REPAIR & REPLACEMENT**

Same as for Model 200SGL111Q

**TESTING**

Same as for Model 200SGL111Q

**ILLUSTRATED PARTS LIST**

Same as for Model 200SGL111Q,  
except variations as noted by  
Usage Code Symbols.



## DIFFERENCE DATA SHEETS

|                          |                     |
|--------------------------|---------------------|
| <b>STARTER-GENERATOR</b> | <b>200SGL111Q-3</b> |
|--------------------------|---------------------|

The basic parts differences between Models 200SGL111Q and 200SGL111Q-3 is the Drive Shaft, Stator, Terminal Block and Air Blast Cover.

Model 200SGL111Q-3 is a shunt start generator and has a QAD housing designed for mounting on an engine with a MS3331-1 mounting flange.

### DESCRIPTION AND OPERATION

Same as for Model 200SGL111Q

### DISASSEMBLY AND ASSEMBLY

Same as for Model 200SGL111Q,  
except as follows:  
Terminal Block and Generator Wiring  
Diagram (See Fig. 6-7)

### REPAIR & REPLACEMENT

Same as for Model 200SGL111Q

### TESTING

Same as for Model 200SGL111Q,  
except as follows:  
Schematic Hook up Starter Test  
(See Fig. 6-3)  
Equalizing Voltage Test (See Fig. 3-4)  
Acceleration Run (See Page 6-5)

### ILLUSTRATED PARTS LIST

Same as for Model 200SGL111Q,  
except variations as noted by  
Usage Code Symbols



## DIFFERENCE DATA SHEETS

|                          |                     |
|--------------------------|---------------------|
| <b>STARTER-GENERATOR</b> | <b>200SGL115Q-2</b> |
|--------------------------|---------------------|

The basic parts differences between Models 200SGL115Q-2 and 200SGL115Q is the Drive Shaft Assembly, Fan Assembly and Bearings

Model 200SGL115Q-2 has High Temperature Bearings P/N 150SG1052-10.

### DESCRIPTION AND OPERATION

Same as for Model 200SGL115Q

### DISASSEMBLY AND ASSEMBLY

Same as for Model 200SGL115Q

### REPAIR & REPLACEMENT

Same as for Model 200SGL115Q

### TESTING

Same as for Model 200SGL115Q

### ILLUSTRATED PARTS LIST

Same as for Model 200SGL115Q,  
except variations as noted by  
Usage Code Symbols



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## DIFFERENCE DATA SHEETS

**STARTER-GENERATOR**

**200SGL119Q-2**

The basic parts differences between Models 200SGL119Q and 200SGL119Q-2 is the Armature Shaft Damper Plate and Friction Ring.

### DESCRIPTION AND OPERATION

Same as for Model 200SGL119Q

### DISASSEMBLY AND ASSEMBLY

Same as for Model 200SGL119Q  
(See Section VI for Belleville spring instructions)

### REPAIR & REPLACEMENT

Same as for Model 200SGL119Q

### TESTING

Same as for Model 200SGL119Q  
except as follows:  
Equalizing Voltage Test (See Fig. 3-4)

### ILLUSTRATED PARTS LIST

Same as for Model 200SGL119Q,  
except variations noted by  
Usage Code Symbols



## DIFFERENCE DATA SHEETS

|                          |                   |
|--------------------------|-------------------|
| <b>STARTER-GENERATOR</b> | <b>200SGL132Q</b> |
|--------------------------|-------------------|

The basic parts differences between Models 200SGL124Q and 200SGL132Q are the Fan, and Fan Cover.

The QAD Housing is designed for mounting on an engine with a MS3331-1 Mounting Flange

**DESCRIPTION AND OPERATION**

Same as for Model 200SGL124Q

**DISASSEMBLY AND ASSEMBLY**

Same as for Model 200SGL124Q,

**REPAIR & REPLACEMENT**

Same as for Model 200SGL124Q

**TESTING**

Same as for Model 200SGL124Q

**ILLUSTRATED PARTS LIST**

Same as for Model 200SGL124Q,  
except variations as noted by  
Usage Code Symbols



## DIFFERENCE DATA SHEETS

|                          |                   |
|--------------------------|-------------------|
| <b>STARTER-GENERATOR</b> | <b>200SGL142Q</b> |
|--------------------------|-------------------|

The basic parts differences between Models 200SGL142Q and 200SGL119Q is the Stator, Drive Shaft Assembly, Terminal Block, and Air Inlet Cover.

### DESCRIPTION AND OPERATION

Same as for Model 200SGL119Q

### DISASSEMBLY AND ASSEMBLY

Same as for Model 200SGL119Q  
except as follows:  
Terminal Block and Generator Wiring  
Diagram (See Fig. 6-6),

### REPAIR & REPLACEMENT

Same as for Model 200SGL119Q

### TESTING

Same as for Model 200SGL119Q  
except as follows:  
Equalizing Voltage Test (See Fig. 3-4)

### ILLUSTRATED PARTS LIST

Same as for Model 200SGL119Q,  
except variations as noted by  
Usage Code Symbols.



## DIFFERENCE DATA SHEETS

|                          |                   |
|--------------------------|-------------------|
| <b>STARTER-GENERATOR</b> | <b>200SGL144Q</b> |
|--------------------------|-------------------|

The basic parts differences between Models 200SGL144Q and 200SGL115Q is the Bearings, Fan, Fan Cover, Air Inlet Assembly and Drive Shaft Assembly.

Model 200SGL144Q has High Temperature Bearings P/N 150SG1052-10.

**DESCRIPTION AND OPERATION**

Same as for Model 200SGL115Q

**DISASSEMBLY AND ASSEMBLY**

Same as for Model 200SGL115Q

**REPAIR & REPLACEMENT**

Same as for Model 200SGL115Q

**TESTING**

Same as for Model 200SGL115Q

**ILLUSTRATED PARTS LIST**

Same as for Model 200SGL115Q,  
except variations as noted by  
Usage Code Symbols.



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## DIFFERENCE DATA SHEETS

**STARTER-GENERATOR**

**200SGL145Q**

The basic parts differences between Models 200SGL111Q and 200SGL145Q is the Air Blast Cover. The QAD Housing is designed for mounting on an engine with a MS3331-1 mounting flange.

**DESCRIPTION AND OPERATION**

Same as for Model 200SGL111Q

**DISASSEMBLY AND ASSEMBLY**

Same as for Model 200SGL111Q

**REPAIR & REPLACEMENT**

Same as for Model 200SGL111Q

**TESTING**

Same as for Model 200SGL111Q

**ILLUSTRATED PARTS LIST**

Same as for Model 200SGL111Q,  
except variations as noted by  
Usage Code Symbols.



## DIFFERENCE DATA SHEETS

### STARTER-GENERATOR

200SGL147Q

The basic parts differences between Models 200SGL111Q and 200SGL147Q is the Drive Shaft, Stator, Terminal Block, Armature, Brushes, Drive End Bell, QAD Housing, Commutator Head Bearing, Bearing Retainer, Fan and Air Blast Cover.

Model 200SGL147Q is a shunt start generator using a speed sensor and spur gear.

Model 200SGL147Q is designed to allow manual rotation "In one Direction" using Turning Tool P/N 160SG1383

#### DESCRIPTION AND OPERATION

Same as for Model 200SGL111Q

#### DISASSEMBLY AND ASSEMBLY

Same as for Model 200SGL111Q,  
except as follows:  
Magnetic Pickup and Spur Gear  
(See Page 6-2)  
Terminal Block and Generator Wiring  
Diagram (See Fig. 6-4)

#### REPAIR & REPLACEMENT

Same as for Model 200SGL111Q

#### TESTING

Same as for Model 200SGL111Q,  
except as follows:  
Schematic Hook up Starter Test  
(See Fig. 6-3)  
Equalizing Voltage Test (See Fig. 3-4)  
Speed pick up Test (See Page 6-4)  
Acceleration Run (See Page 6-5)

#### ILLUSTRATED PARTS LIST

Same as for Model 200SGL111Q,  
except variations as noted by  
Usage Code Symbols



## DIFFERENCE DATA SHEETS

### STARTER-GENERATOR

200SGL132Q-3

The basic parts difference between Models 200SGL132Q and 200SGL132Q-3 are the Brush Holder, Brush and Air Inlet Cover.

#### DESCRIPTION AND OPERATION:

Same as for Model 200SGL132Q

#### DISASSEMBLY & ASSEMBLY:

Same as for Model 200SGL132Q

#### CLEANING:

Same as for Model 200SGL132Q

#### INSPECTION:

Same as for Model 200SGL132Q

#### REPAIR:

Same as for Model 200SGL132Q

#### FITS AND CLEARANCES:

Same as for Model 200SGL132Q

#### TESTING:

Same as for Model 200SGL132Q  
Except: Use Table VI from Section III  
for Acceptance Test Data Sheet

#### TROUBLESHOOTING:

Same as for Model 200SGL132Q

#### SPECIAL TOOLS, FIXTURES & EQUIPMENT:

Same as for Model 200SGL132Q

#### ILLUSTRATED PARTS LIST:

Same as for Model 200SGL132Q

**Except:** the 200SGL132Q-3 uses the  
following parts:

Brush Holder: 200SGL1154-3

Brush ('XL2'): 200SGL1009-10X2

Fan Cover Assy: 200SGL1014-15

Nameplate: 200SGL1092-59  
(See also SL 192)



## DIFFERENCE DATA SHEETS

### STARTER-GENERATOR

200SGL131Q

The basic parts differences between Models 200SGL111Q and 200SGL131Q is the Drive Shaft Assy, Stator, Terminal Block, Armature, Drive End Bell, QAD Housing and Air Blast Cover.

Model 200SGL131Q is a shunt start generator using a speed sensor and spur gear. The QAD conforms to MS3331-1.

Model 200SGL131Q has the magnetic pick up leads wired as shown on Fig. 6-5 (Per Service Bulletin SB150SG116).

Model 200SGL131Q has the improved Magnetic Speed Pick up P/N 300SG1222-2 (Per Service Bulletin SB150SG117).

|                                   |                                                                                                                                                                                                                                       |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DESCRIPTION AND OPERATION:</b> | Same as for Model 200SGL111Q                                                                                                                                                                                                          |
| <b>DISASSEMBLY AND ASSEMBLY:</b>  | Same as for Model 200SGL111Q, except as follows:<br>Magnetic Pickup and Spur Gear<br>(See Page 6-2)<br>Terminal Block and Generator Wiring<br>Diagram (See Fig. 6-5)<br>Belleville Spring Installation Instructions<br>(See Fig. 6-8) |
| <b>REPAIR &amp; REPLACEMENT:</b>  | Same as for Model 200SGL111Q                                                                                                                                                                                                          |
| <b>TESTING:</b>                   | Same as for Model 200SGL111Q, except as follows:<br>Schematic Hook up Starter Test (See Fig. 6-3)<br>Speed pick up Test (See Page 6-4)<br>Acceleration Run (See Page 6-5)                                                             |
| <b>ILLUSTRATED PARTS LIST:</b>    | Same as for Model 200SGL111Q except variations as noted by Usage Code Symbols.                                                                                                                                                        |



## DIFFERENCE DATA SHEETS

### STARTER-GENERATOR

200SGL131Q-2

The basic parts differences between Models 200SGL111Q and 200SGL131-2Q is the Drive Shaft Assy, Stator, Terminal Block, Armature, Drive End Bell, QAD Housing and Air Blast Cover.

Model 200SGL131Q-2 is a shunt start generator using a speed sensor and spur gear. The QAD conforms to MS3331-1.

Model 200SGL131Q-2 has the magnetic pick up leads wired as shown on Fig. 6-5 (Per Service Bulletin 19-SB150SG116).

Model 200SGL131Q-2 has the improved Magnetic Speed Pick up P/N 300SG1222-2 (Per Service Bulletin 19-SB150SG117).

|                                   |                                                                                                                                                                                                                                       |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DESCRIPTION AND OPERATION:</b> | Same as for Model 200SGL111Q                                                                                                                                                                                                          |
| <b>DISASSEMBLY AND ASSEMBLY:</b>  | Same as for Model 200SGL111Q, except as follows:<br>Magnetic Pickup and Spur Gear<br>(See Page 6-2)<br>Terminal Block and Generator Wiring<br>Diagram (See Fig. 6-5)<br>Belleville Spring Installation Instructions<br>(See Fig. 6-8) |
| <b>REPAIR &amp; REPLACEMENT:</b>  | Same as for Model 200SGL111Q                                                                                                                                                                                                          |
| <b>TESTING:</b>                   | Same as for Model 200SGL111Q, except as follows:<br>Schematic Hook up Starter Test (See Fig. 6-3)<br>Speed pick up Test (See Page 6-4)<br>Acceleration Run (See Page 6-5)                                                             |
| <b>ILLUSTRATED PARTS LIST:</b>    | Same as for Model 200SGL111Q except variations as noted by Usage Code Symbols.                                                                                                                                                        |



## DIFFERENCE DATA SHEETS

### STARTER-GENERATOR

200SGL151Q  
(1 of 2)

The basic parts differences between Models 200SGL111Q and 200SGL151Q are the Drive Shaft Assembly, Bearings, XL2 Brushes, QAD Flange, Terminal Block, Fan Assembly, Commutator Head Assembly, Stator Assembly, Housing and Screen Assembly, Nameplate, and Fan Cover Assembly.

#### DESCRIPTION AND OPERATION:

Model 200SGL151Q is a Shunt start Generator and has a QAD designed for mounting on an engine with a AND10262-XIIA Mounting Flange.

#### DISASSEMBLY AND ASSEMBLY:

Same as for Model 200SGL111Q except for as follows: Terminal Block and Generator Wiring Diagram (See Fig 6-7).

#### CLEANING:

Same as for Model 200SGL111Q

#### INSPECTION:

Same as for Model 200SGL111Q

#### REPAIR:

Same as for Model 200SGL111Q

#### FITS AND CLEARANCES:

Same as for Model 200SGL111Q

#### TESTING:

Same as for Model 200SGL111Q except for as follows: Schematic Hook-up Starter Test (See Fig 6-3), Acceleration Run (Not Required). (See Table VII for Acceptance Test Record)

#### SPECIAL TOOLS, FIXTURES & EQUIPMENT:

Same as for Model 200SGL111Q

#### ILLUSTRATED PARTS LIST

(See next page)



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## DIFFERENCE DATA SHEETS

**STARTER-GENERATOR**

**200SGL151Q**  
**(2 of 2)**

### ILLUSTRATED PARTS LIST:

Same as for Model 200SGL111Q except the  
200SGL151Q uses the following parts:

200SGL1107-2 Fan Assembly  
200SGL1153-2 Commutator Head Assy  
200SGL1014-18 Fan Cover Assy  
150SG1052-1 Bearings  
200SGL1009-10X2 Brushes  
200SGL1061-3 Terminal Block Assy  
200SGL1156-1 Stator Assy  
200SGL1301-3 Housing & Screen Assy  
200SGL1103-21 Drive Shaft Assy  
200SGL1092-63 Nameplate  
200SGL1040-5 QAD Flange



## DIFFERENCE DATA SHEETS

### STARTER-GENERATOR

200SGL132Q-4

The basic parts differences between Models 200SGL132Q and 200SGL132Q-4 are the Fan, Fan Cover, ID Plate, Brush Holder & Spring Assy, Comm Head Assy, Brush Holder Assy.

Model 200SGL132Q-4 is a series start generator.

**DESCRIPTION AND OPERATION:** Same as for Model 200SGL132Q.

**DISASSEMBLY AND ASSEMBLY:** Same as for Model 200SGL132Q.

**CLEANING:** Same as for Model 200SGL132Q.

**INSPECTION:** Same as for Model 200SGL132Q.

**REPAIR:** Same as for Model 200SGL132Q.

**FITS AND CLEARANCES:** Same as for Model 200SGL132Q.

**TESTING:** Same as for Model 200SGL132Q  
Except: Use Table VI from  
Section III for Acceptance Test  
Data Sheet

**TROUBLESHOOTING:** Same as for Model 200SGL132Q.

**SPECIAL TOOLS, FIXTURES** Same as for Model 200SGL132Q.

**ILLUSTRATED PARTS LIST:** Same as for Model 200SGL132Q  
**Except** 200SGL132Q-4 uses the  
following parts:

200SGL1011-17 Fan Cover  
200SGL1092-64 ID Plate

200SGL1107-5 Fan Assy

200SGL1154-3 Brush Holder Assy  
200SGL1138-1 Brush Holder & Spring  
Assy  
200SGL1153-2 Comm Head Assy



## DIFFERENCE DATA SHEETS

### STARTER-GENERATOR

200SGL147Q-2

The basic parts differences between Models 200SGL111Q and 200SGL147Q-2 is the Drive Shaft, Stator, Terminal Block, Armature, Brushes, Drive End Bell, QAD Housing, Commutator Head Bearing, A. Drive Bearing, Bearing Retainer, Fan and Air Blast Cover.

Model 200SGL147Q is a shunt start generator using a speed sensor and spur gear.

The following are comparisons to the 200SGL111Q except for the Illustrated Parts List.

#### DESCRIPTION AND OPERATION:

Same as for Model 200SGL111Q.

#### DISASSEMBLY AND ASSEMBLY:

Same as for Model 200SGL111Q  
except as follows:

Magnetic Pickup and Spur Gear (See  
Page 6-2).  
Terminal Block and Generator Wiring  
Diagram (See Page 6-7,  
Fig. 6-4).

#### REPAIR AND REPLACEMENT:

Same as for Model 200SGL111Q.

#### TESTING:

Same as for Model 200SGL111Q  
except as follows:

Schematic Hook up Starter Test  
(See Fig. 6-3)  
Equalizing Voltage Test  
(See Fig. 3-4)  
Speed pick-up Test (See Page 6-4)  
Acceleration Run (See Page 6-5)

#### ILLUSTRATED PARTS LIST:

Same as for Model 200SGL147Q  
except the 200SGL147Q-2 uses the  
following parts:

200SGL1011-15 Fan Cover  
200SGL1092-57 Nameplate



## DIFFERENCE DATA SHEETS

### STARTER-GENERATOR

200SGL147Q-3

The basic parts differences between Models 200SGL111Q and 200SGL147Q-3 is the Drive Shaft, Stator, Terminal Block, Armature, Brushes, Drive End Bell, QAD Housing, Commutator Head Bearing, A. Drive Bearing, Bearing Retainer, Fan and Air Blast Cover.

Model 200SGL147Q is a shunt start generator using a speed sensor and spur gear.

The following are comparisons to the 200SGL111Q except for the Illustrated Parts List differences.

**DESCRIPTION AND OPERATION:** Same as for Model 200SGL111Q.

**DISASSEMBLY AND ASSEMBLY:** Same as for Model 200SGL111Q except as follows:  
Magnetic Pickup and Spur Gear (See Page 6-2).  
Terminal Block and Generator Wiring Diagram (See Fig. 6-4).

**REPAIR AND REPLACEMENT:** Same as for Model 200SGL111Q.

**TESTING:** Same as for Model 200SGL111Q except as follows:  
Schematic Hook up Starter Test (See Fig. 6-3).  
Equalizing Voltage Test (See Fig. 3-4).  
Speed pick up Test (See Page 6-4).  
Acceleration Run (See Page 6-5).

**ILLUSTRATED PARTS LIST:** Same as for Model 200SGL147Q except the 200SGL147Q-3 uses the following parts:  
200SGL1011-15 Fan Cover  
200SGL1052-5 Drive End Ball Bearing  
150SG1052-1 Anti Drive End Ball Bearing  
200SGL1092-72 Nameplate



## DIFFERENCE DATA SHEET

### STARTER-GENERATOR

200SGL132Q-5

The basic parts differences between Models 200SGL111Q and 200SGL132Q-5 are shown in the Illustrated Parts List below.

The following are comparisons to the 200SGL111Q:

**DESCRIPTION AND OPERATION:** Same as for Model 200SGL111Q.

**DISASSEMBLY AND ASSEMBLY:** Same as for Model 200SGL111Q except as follows:  
Magnetic Pickup and Spur Gear (See Page 6-2).  
Terminal Block and Generator Wiring Diagram (See Fig. 6-7A).

**REPAIR AND REPLACEMENT:** Same as for Model 200SGL111Q.

**TESTING:** Use Acceptance Test Data Sheet (See Section III, Table VI).  
Schematic Hook up Starter Test (See Fig. 6-3).  
Equalizing Voltage Test (See Fig. 3-3).  
Acceleration Run (See Page 6-5).

**ILLUSTRATED PARTS LIST:** Same as for Model 200SGL111Q except the 200SGL132Q-5 uses the following parts:

|                                            |                                         |
|--------------------------------------------|-----------------------------------------|
| 150SG1036-4 Fan                            | 200SGL1092-67 Id Plate For 132q-5       |
| 150SG1052-1 Bearing                        | 200SGL1103-11 Drive Shaft Assy          |
| 200SGL1009-10X2 "X12" Brush                | 200SGL1107-2 Fan Assy                   |
| 200SGL1014-39 Fan Cover Assy               | 200SGL1138-1 Brush Holder & Spring Assy |
| 200SGL1061-4 Terminal Block Assy Srs,Axial | 200SGL1153-2 Comm Head Assy             |
| 200SGL1064-XL Armature Assy,XI Series      | 200SGL1154-3 Brush Holder Assy          |
|                                            | 200SGL1360 XL Label                     |



## DIFFERENCE DATA SHEETS

### STARTER-GENERATOR

200SGL131Q-5

The basic parts differences between Models 200SGL111Q and 200SGL131Q-5 are shown in the Illustrated Parts List below.

Model 200SGL131Q-5 is a shunt start generator using a speed sensor and spur gear.

The following are comparisons to the 200SGL111Q:

**DESCRIPTION AND OPERATION:** Same as for Model 200SGL111Q.

**DISASSEMBLY AND ASSEMBLY:** Same as for Model 200SGL111Q except as follows:  
Magnetic Pickup and Spur Gear (See Page 6-2).  
Terminal Block and Generator Wiring Diagram (Fig. 6-6).

**REPAIR AND REPLACEMENT:** Same as for Model 200SGL111Q.

**TESTING:** Same as for Model 200SGL111Q except as follows:  
Schematic Hook up Starter Test (See Fig. 6-3).  
Equalizing Voltage Test (See Fig. 3-4).  
Speed pick up Test (See Page 6-4).  
Acceleration Run (See Page 6-5).

**ILLUSTRATED PARTS LIST:** Same as for Model 200SGL111Q except the 200SGL131Q-5 uses the following parts:

200SG1221 Spacer,Connector  
200SGL1009-5 Brush-XI2  
200SGL1014-2 Blast Cover Assy  
200SGL1061-2 Term Block,Shnt,Radl  
200SGL1064-1 Armature Assy  
200SGL1064-1-XL Armature Assy,XI Series  
(interchangeable w/200SGL1064-1 per  
SB 200SG146)  
200SGL1083-2 QAD Assy  
200SGL1092-75 Nameplate For 131q-5  
200SGL1103-3 Drive Shaft Assy

200SGL1108 Clamp,Flat,Retaining (air spout)  
200SGL1156-5 Stator Assy  
200SGL1219-1 Spur Gear  
200SGL1301-2 Housing & Screen Assy  
200SGL1318 Cover,Term Block  
  
200SGL1360 XL Label  
250SG1093 Spring,Belleville  
300SG1222-2 Magnetic P/Up,Passive  
MS3112E8-3P Connector



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## DIFFERENCE DATA SHEET

### STARTER-GENERATOR

**MODEL: 200SGL129Q(3)**

Model 200SGL129Q(3) is an "XL", shunt type, wet spline starter generator.

The basic parts differences between models 200SGL129Q(3) and 200SGL129Q are located in the table below.

|                                   |                               |
|-----------------------------------|-------------------------------|
| <b>DESCRIPTION AND OPERATION:</b> | Same as for Model 200SGL129Q. |
| <b>DISASSEMBLY AND ASSEMBLY:</b>  | Same as for Model 200SGL129Q  |
| <b>CLEANING:</b>                  | Same as for Model 200SGL129Q. |
| <b>INSPECTION:</b>                | Same as for Model 200SGL129Q. |
| <b>REPAIR:</b>                    | Same as for Model 200SGL129Q. |
| <b>FITS AND CLEARANCES:</b>       | Same as for Model 200SGL129Q. |
| <b>TESTING:</b>                   | Per TM 105A Test Procedures.  |
| <b>TROUBLESHOOTING:</b>           | Same as for Model 200SGL129Q. |
| <b>SPECIAL TOOLS, FIXTURES</b>    | Same as for Model 200SGL129Q. |
| <b>ILLUSTRATED PARTS LIST:</b>    | Same as for Model 200SGL129Q, |

**Except:** 200SGL129Q(3) uses the following parts:

|                 |                          |
|-----------------|--------------------------|
| 200SGL1009-3    | Brush-XL                 |
| 200SGL1040-3    | QAD Flange, Dry          |
| 200SGL1064-5-XL | Armature Assy, XL Series |
| 200SGL1092-25S  | Name Plate For 129Q(3)   |
| 200SGL1360S     | Label, XL                |



## DIFFERENCE DATA SHEET

### STARTER-GENERATOR

**MODEL: 200SGL132Q-2**

Model 200SGL132Q-2 is an XL2, series type, wet spline starter generator.

The basic parts differences between Models 200SGL132Q-2 and 200SGL132Q are located in the table below.

|                                   |                                                                                     |
|-----------------------------------|-------------------------------------------------------------------------------------|
| <b>DESCRIPTION AND OPERATION:</b> | Same as for Model 200SGL132Q.                                                       |
| <b>DISASSEMBLY AND ASSEMBLY:</b>  | Same as for Model 200SGL132Q                                                        |
| <b>CLEANING:</b>                  | Same as for Model 200SGL132Q.                                                       |
| <b>INSPECTION:</b>                | Same as for Model 200SGL132Q.                                                       |
| <b>REPAIR:</b>                    | Same as for Model 200SGL132Q.                                                       |
| <b>FITS AND CLEARANCES:</b>       | Same as for Model 200SGL132Q.                                                       |
| <b>TESTING:</b>                   | Per TM 105A Test Procedures.                                                        |
| <b>TROUBLESHOOTING:</b>           | Same as for Model 200SGL132Q.                                                       |
| <b>SPECIAL TOOLS, FIXTURES</b>    | Same as for Model 200SGL132Q.                                                       |
| <b>ILLUSTRATED PARTS LIST:</b>    | Same as for the 200SGL132Q,<br><b>Except</b> 200SGL132Q-2 uses the following parts: |

#### Differences with 200SGL132Q:

200SGL1092-56 Name Plate  
200SGL1360-1S XL2 Label

200SGL1103-19 Drive Shaft Assembly



## DIFFERENCE DATA SHEET

### STARTER-GENERATOR

**MODEL: 200SGL153Q**

Model 200SGL153Q is a shunt type, wet spline starter generator designed for longer brush life and TBO intervals.

The basic parts differences between models 200SGL153Q and 200SGL119Q-2 are located in the table below.

|                                   |                                                                                   |
|-----------------------------------|-----------------------------------------------------------------------------------|
| <b>DESCRIPTION AND OPERATION:</b> | Same as Model 200SGL119Q-2                                                        |
| <b>DISASSEMBLY AND ASSEMBLY:</b>  | Same as Model 200SGL119Q-2<br>(See Section VI for Belleville spring instructions) |
| <b>CLEANING:</b>                  | Same as Model 200SGL119Q-2                                                        |
| <b>INSPECTION:</b>                | Same as Model 200SGL119Q-2                                                        |
| <b>REPAIR:</b>                    | Same as Model 200SGL119Q-2                                                        |
| <b>FITS AND CLEARANCES:</b>       | Same as Model 200SGL119Q-2                                                        |
| <b>TESTING:</b>                   | Per TM 105A Test Procedures.                                                      |
| <b>TROUBLESHOOTING:</b>           | Same as Model 200SGL119Q-2                                                        |
| <b>SPECIAL TOOLS, FIXTURES</b>    | Same as Model 200SGL119Q-2                                                        |
| <b>ILLUSTRATED PARTS LIST:</b>    | Same as Model 200SGL119Q-2                                                        |

**Except:** 200SGL153Q uses:

200SGL1009-7 Brush  
200SGL1092-76S Nameplate  
200SGL1360-1S Label, XL2



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## SECTION VI

### MAINTENANCE & TEST PROCEDURE DIFFERENCE DATA SHEET INDEX

|                                                                                                            |     |
|------------------------------------------------------------------------------------------------------------|-----|
| MAGNETIC PICK-UP AND SPUR GEAR .....                                                                       | 6-2 |
| SPEED PICK UP TEST .....                                                                                   | 6-4 |
| ACCELERATION RUN .....                                                                                     | 6-5 |
| SCHEMATIC HOOK UP STARTER TEST .....                                                                       | 6-6 |
| TERMINAL BLOCK AND GENERATOR<br>WIRING DIAGRAM.....                                                        | 6-7 |
| BELLEVILLE SPRING INSTALLATION INSTRUCTIONS.....<br>(200SGL119Q, 200SGL119Q-2, 200SGL131Q-5, & 200SGL153Q) | 6-8 |



## MAINTENANCE & TEST PROCEDURE DIFFERENCE DATA SHEETS

### MAGNETIC PICK-UP AND SPUR GEAR

### 200SGL SERIES

#### DISASSEMBLY

1. Removal of magnetic pick-up and spur gear.
  - a) Remove four screws (36) and carefully lift connector (33) from spacer. Unsolder lead wires from connector pins and remove connector (33) and spacer (34) from the stator housing assembly.
  - b) Carefully pull the magnetic pick-up wires from the stator. Do not remove the magnetic pick-up or change its settings unless necessary.
  - c) Remove the spur gear (Figure 4-2) (18) from armature using suitable puller.

#### ASSEMBLY

2. Assembly of speed pick-up and spur gear.

If grommet was removed, install grommet (14). If magnetic pick-up (35) was removed at disassembly, install pick-up loosely into thread boss on drive end bell (10).

  - a) If heat shrinkable sleeving was removed at disassembly, cover leads above pick-up with 1/8" diameter heat shrinkable sleeving MIL-I-23053-15. Use heat gun to shrink sleeving.
  - b) Feed end of pick-up leads through hole in stator, making sure the leads are out of the way of the armature.
  - c) Press Spur Gear (Figure 4-2) (18) on armature shaft with small extended hub against ball bearing (6).
  - d) If pick-up was removed from DE end bell, adjust pick-up to obtain 0.004 to 0.006 inch gap between pick-up and spur gear (18). Tighten locknut on magnetic pick-up and recheck gap again. Using lacing tape MIL-T-43435, tie pick-up leads to screen.
  - e) Pull leads gently through hole in stator hole in the spacer (34). When correctly installed, lead groove in spacer will be against stator housing.



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## MAINTENANCE & TEST PROCEDURE DIFFERENCE DATA SHEETS

### MAGNETIC PICK-UP AND SPUR GEAR

### 200SGL SERIES

- f) Slide #12 Varflex A397, Grade F-B-1 sleeving over back and white leads. Solder leads to connector. \*Solder black lead to pin "A" and white lead to pin "B". Slide sleeving over connector terminals and wire ends. Use heat gun to shrink in place.  
\* Refer to Generator Wiring Schematic Diagram. Some Models "Black & White leads are Reversed"
- g) Gently pull excess slack in leads and coil in cavity of spacer. Position connector over spacer, making sure leads are positioned in slot spacer.
- h) Coat threads of four screws with anti-seize compound and secure screws to housing. Use stainless steel lockwire.



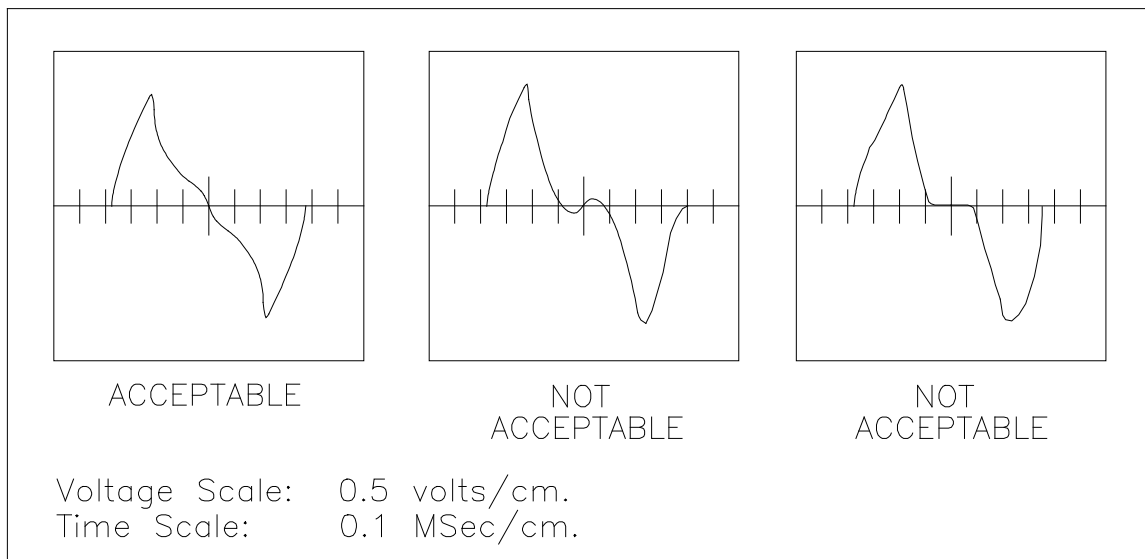
## MAINTENANCE & TEST PROCEDURE DIFFERENCE DATA SHEETS

### SPEED PICK UP TEST

### 200SGL SERIES

#### TESTING

1. Speed Pick-up Test
  - a) Run the generator at 6,000 rpm with field switch open. Connect a 20 kilohm + 10% load to the speed pick-up output connector between pins B and A and connect an oscilloscope across it. Observe the output voltage.
  - b) Acceptance Limits: The peak to peak voltage shall be (2.5) volts minimum. Typical acceptable voltage wave form shall be shown in Figure 6-1.



**FIGURE 6-2**  
**TYPICAL SPEED PICK-UP OUTPUT VOLTAGE WAVE FORM**



## MAINTENANCE & TEST PROCEDURE DIFFERENCE DATA SHEETS

### ACCELERATION RUN

200SGL SERIES

#### TESTING

##### 1.0 Acceleration Run

- a) Remove the starter-generator from the generator test stand and connect to an acceleration test stand with a flywheel 12 inches in diameter and .836 inches thick. The flywheel should rotate on ball bearings sized to the weight and rpm of the wheel.

#### **CAUTION**

**The flywheel should be protected by a metal protection shield to avoid injury.**

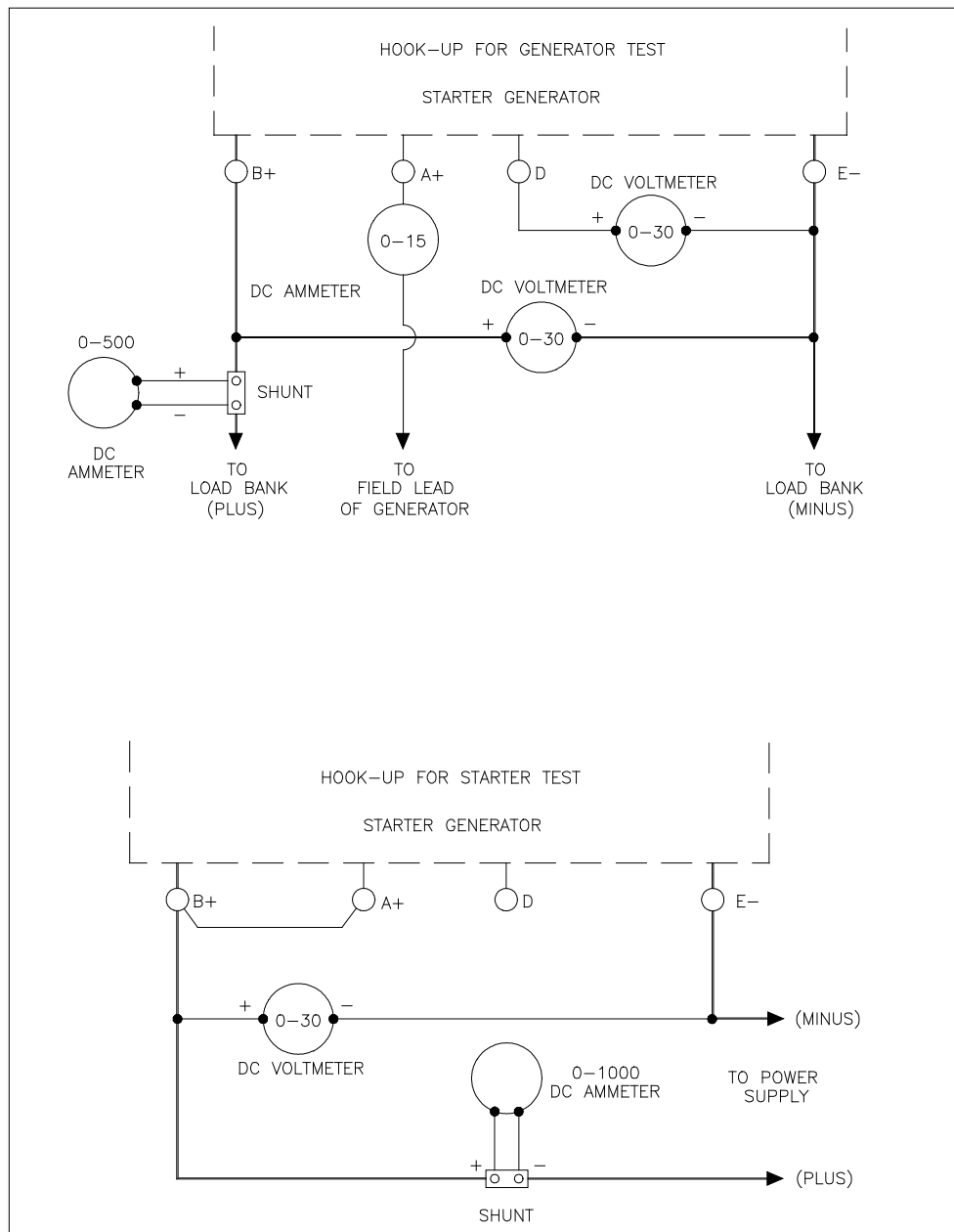
- b) With 28 volts DC starting power applied, close starting switch. The Starter-Generator must accelerate the flywheel to a speed of 3,800 rpm within 30 seconds.



## MAINTENANCE & TEST PROCEDURE DIFFERENCE DATA SHEETS

### HOOK UP FOR STARTER TEST

### 200SGL SERIES



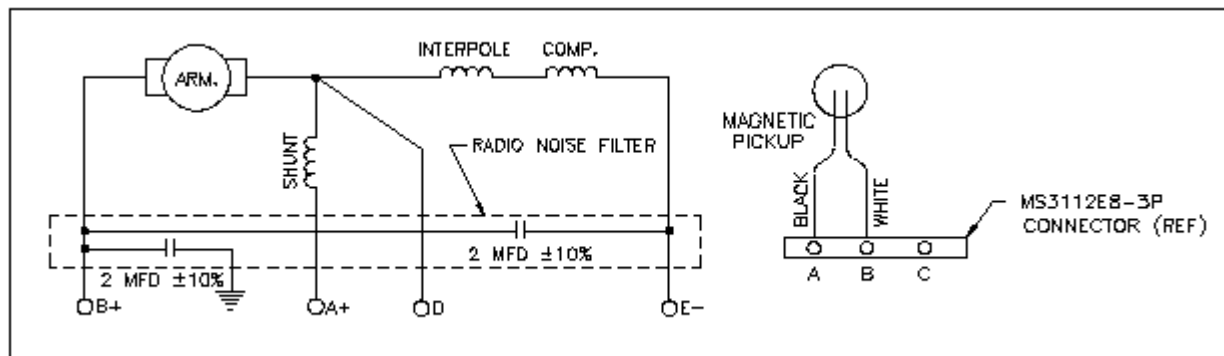
**FIGURE 6-3**  
**TEST SCHEMATIC FOR TESTING SHUNT START GENERATORS**  
**(W/OUT "C" TERMINAL)**



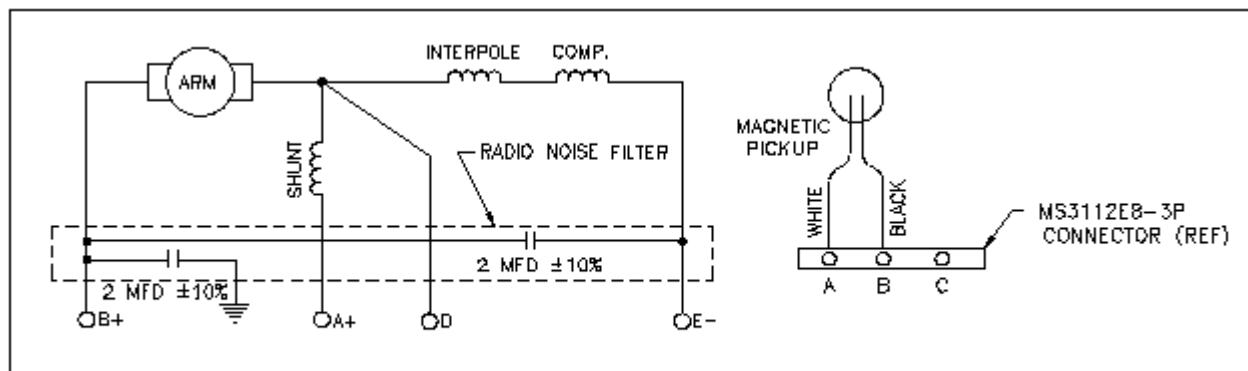
## MAINTENANCE & TEST PROCEDURE DIFFERENCE DATA SHEETS

### TERMINAL BLOCK AND GENERATOR WIRING DIAGRAM

200SGL SERIES



**FIGURE 6-4**  
**TERMINAL BLOCK & GENERATOR SCHEMATIC WIRING DIAGRAM**



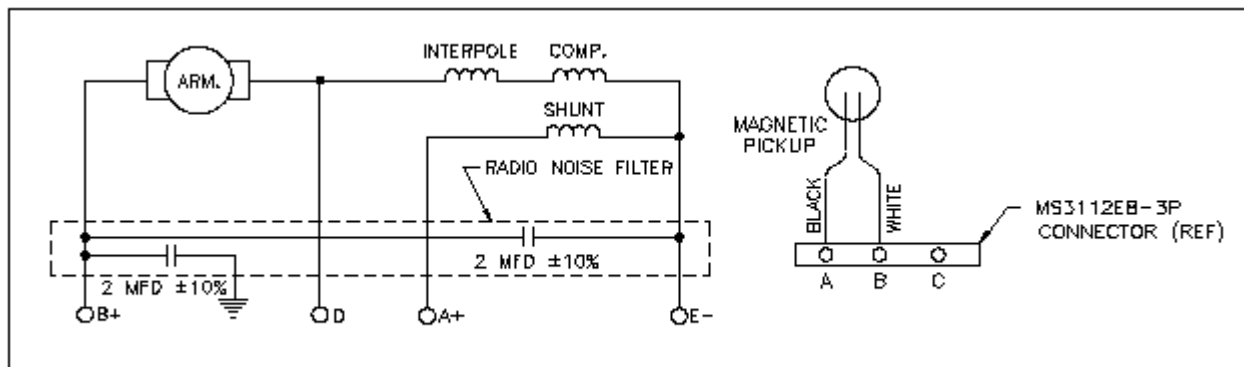
**FIGURE 6-5**  
**TERMINAL BLOCK & GENERATOR SCHEMATIC WIRING DIAGRAM**



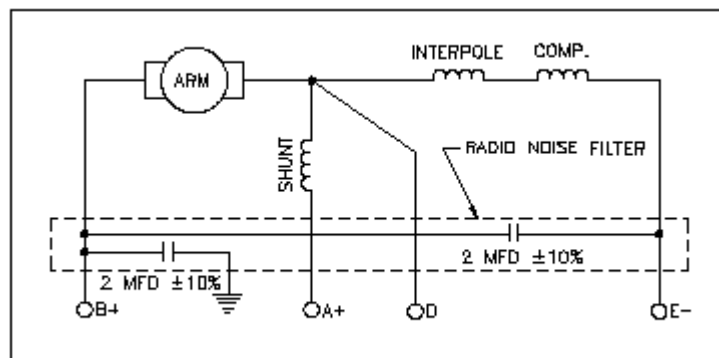
## MAINTENANCE & TEST PROCEDURE DIFFERENCE DATA SHEETS

### TERMINAL BLOCK AND GENERATOR WIRING DIAGRAM

200SGL SERIES



**FIGURE 6-6**  
**TERMINAL BLOCK & GENERATOR SCHEMATIC WIRING DIAGRAM**



**FIGURE 6-7**  
**TERMINAL BLOCK & GENERATOR SCHEMATIC WIRING DIAGRAM**

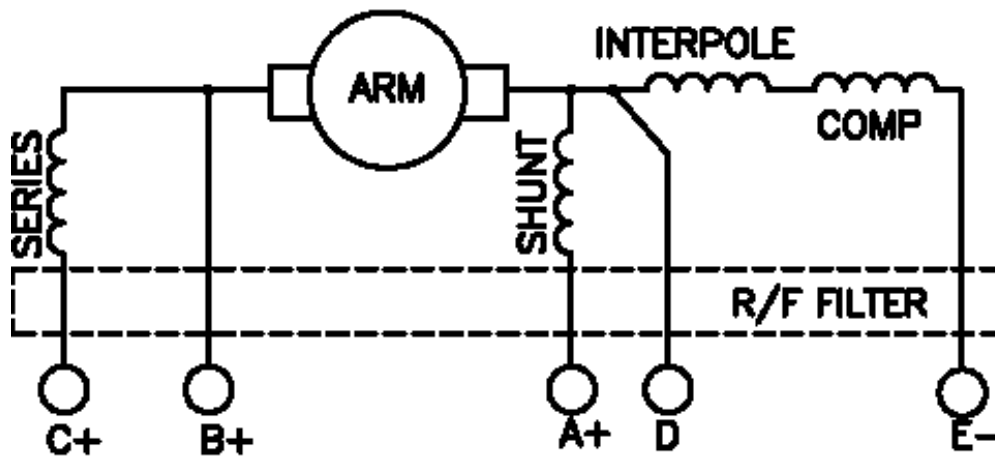


FIGURE 6-7A  
TERMINAL BLOCK & GENERATOR SCHEMATIC WIRING DIAGRAM



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## MAINTENANCE & TEST PROCEDURE DIFFERENCE DATA SHEETS

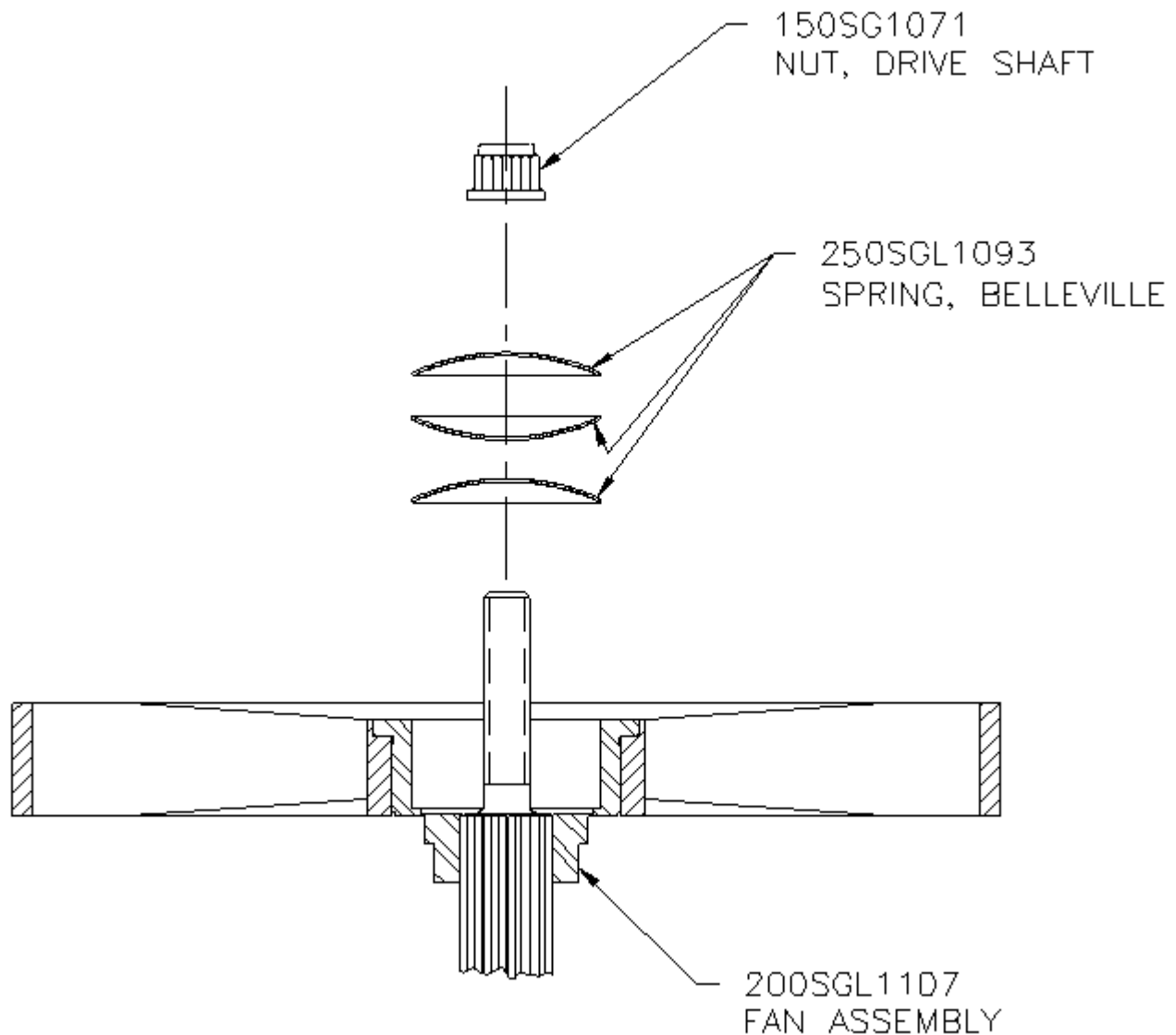
BELLEVILLE SPRING INSTALLATION INSTRUCTIONS

200SGL119Q

200SGL119Q-2

200SGL131Q-5

200SGL153Q



**FIGURE 6-8**  
**BELLEVILLE SPRING INSTALLATION INSTRUCTIONS**



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## SECTION VII

(Reserved for future use)



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## SECTION VIII

### SERVICE BULLETINS

| <b>SB # AND REV<br/>STATUS</b> | <b>SUBJECT</b>                                                                                                                                                                  |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SB150SG105 Rev. C              | Brush Seating SAI Brushes in High Speed (Approx. 12,000 rpm) Starter-Generators and Application of SAI Brushes to SAI Generators                                                |
| SB150SG114 Rev. C              | Starter-Generator Removal and Installation (For all Starter-Generators using QAD Housings)                                                                                      |
| SB150SG124 Rev. C              | Brush Seating SAI Brushes in High Speed (Approx. 12,000 rpm) Starter-Generators and Application of SAI Brushes to SAI Generators During Mid-Life Brush Change Between Overhauls |
| SB150SG128 Rev. D              | Optional modification to "XL" Configuration                                                                                                                                     |
| SB150SG128-1 Rev. C            | Optional modification to "XL2" Configuration                                                                                                                                    |
| SB 150SG151 Rev. A             | Information omitted on data plates.                                                                                                                                             |
| SB 200SG140 Rev. A             | Modification of 200SGL147Q-2 to 200SGL147Q-3.                                                                                                                                   |
| SB 200SG141 Rev. A             | Modification of model 200SGL119Q-2 to higher tension Belleville springs.                                                                                                        |
| SB 200SG156 Rev. A             | Assembly checks of model 200SGL130Q.                                                                                                                                            |
| SB 200SG157 Rev. B             | Assembly checks of model 200SGL115Q-2.                                                                                                                                          |
| SB 200SG158 Rev. A             | Assembly checks of model 200SGL144Q.                                                                                                                                            |
| SB 200SG159 Rev. A             | Reversion of TM 105A to Revision 7.                                                                                                                                             |



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## **SERVICE BULLETIN NO.: SB150SG105**

**SUBJECT: Brush Seating SAI Brushes in High Speed (Approx. 12,000 RPM)  
Starter-Generators and Application of SAI Brushes to SAI Generators**

### **PURPOSE:**

To describe a procedure to be utilized in replacing and seating new brushes in a serviceable starter-generator. Brush seating is of extreme importance. If brushes are not seated prior to use, severe arcing will occur during the starting mode of operation causing damage to the commutator surface and accelerated brush wear.

### **PROCEDURE:**

Brushes installed in newly overhauled starter-generators should have a commutator resurfaced by turning the armature in a lathe to a very fine mirror finish using a diamond or newly honed carbide turning tool. Refer to Overhaul Manual for details.

When installing new Skurka Aerospace Inc. designed brushes in a generator for the first time, it is mandatory that the commutator be resurfaced as mentioned in the paragraph above. The best brush life will always be obtained when resurfacing the commutator prior to installing brushes. Imperfections in the commutator surface and movement of the commutator bars as a result of generator usage over extended periods of time, accelerate brush wear. Do not use any abrasive paper to sand the commutator as the sand particles may become embedded between the commutator bars and cause accelerated brush wear.

Mount the generator securely on a bench in a horizontal position. Motorize the starter-generator by connecting the positive lead of a DC supply to starter-generator terminal C+ for a series start or B+ and A for a shunt start. Connect the negative lead of the DC supply to starter-generator terminal E-. Adjust the DC supply voltage to 15 volts. This will enable the machine to run at approximately 7000-9000 rpm for a series start, and 3000-6000 for a shunt start. The DC input amperes will be approximately 20-40 amperes for 150-250 ampere generators and approximately 30-60 amperes for 300-400 ampere generators.

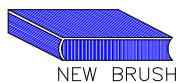
To remove carbon accumulations, fan cover should be removed, exposing the brush area. A portable blower or fan should be set to blow air across the brush area when the starter-generator is running. This procedure will remove the carbon dust from the starter-generator as the brushes are being seated.

An acceptable brush seat should indicate 85-100% brush contact in the direction of rotation and at least 85% parallel to the armature shaft. Continue running the generator to achieve this seating, if brush seating is unacceptable. Refer to Page 2 for typical brush seating. (This film does not indicate brush run-in. See above paragraph).

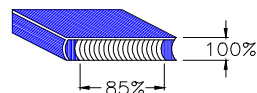
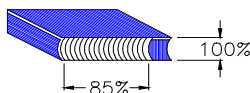
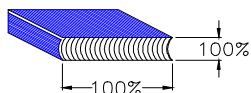
Most SAI grades of brushes are instant filming types and during the procedure of brush seating, a dark film will appear on the commutator surface. This film lowers brush friction and increases brush life.



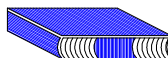
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NEW BRUSH



SATISFACTORILY SEATED BRUSHES



UNSATISFACTORILY SEATED BRUSHES

LEGEND

|                                                                                     |                  |
|-------------------------------------------------------------------------------------|------------------|
|  | NON SEATED AREAS |
|  | SEATED AREAS     |

Typical Brush Seating



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## SERVICE BULLETIN NO.: SB150SG114

SUBJECT: STARTER-GENERATOR REMOVAL and INSTALLATION

TO: All Airlines, Fixed Base Operators and Aircraft Owners

MODELS AFFECTED: All Starter-Generators using QAD Housings

### DISCUSSION:

Expanded procedures have been developed to remove or install the Starter-Generator in conjunction with the procedures provided in current applicable maintenance manuals. These procedures should be utilized each time the Starter-Generator is removed or installed to assist in improving the service life of the Starter-Generator bearings, brushes and drive shaft friction disc.

NOTE: Two mechanics are required to properly remove or install the Starter-Generator.

### CAUTION

Slight misalignment and /or binding  
of the Starter-Generator drive can  
reduce the unit's service life.

#### 1. Removal of Starter-Generator

- a. One mechanic is to maintain the alignment of the Starter Generator by holding the Starter-Generator in position by keeping the mounting surfaces flush with the Quick Attach /Detach adapter (QAD pad), while the other mechanic loosens and removes the 'V' -band clamp.
- b. Carefully remove the Starter-Generator from the QAD pad by maintaining the spline's alignment to prevent binding of the Starter-Generator drive.



2 .Prior to installing the Starter-Generator, verify the following:

- a . There are no burrs or foreign objects on the Starter-Generator Shaft.
- b . The Starter-Generator guide pins are clean and not bent or damaged.
- c . The mounting surfaces of the Starter-Generator and the QAD pad are clean and free of burrs.
- d . Verify that the QAD pad is properly secured to the engine.
- e . The QAD pad guide pin holes are free of burrs, foreign objects and in good condition .

3 . Installation of the Starter-Generator

- a . One mechanic is to gently align the Starter-Generator to the QAD pad, being careful not to put the Starter-Generator drive spline in a bind.
- b . After the Starter-generator has been properly aligned, one mechanic should hold the Starter-Generator in position by keeping the mounting surfaces flush with the QAD pad while the other mechanic installs and secures the 'V' -band clamp.

NOTE: Refer to the applicable aircraft maintenance manual for proper torque, safetying and other detailed removal and installation instructions.



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## **SERVICE BULLETIN NO.: SB150SG124**

**SUBJECT: BRUSH SEATING Skurka Aerospace Inc. (SAI)  
BRUSHES IN HIGH SPEED (APPROX. 12,000 RPM)  
STARTER-GENERATORS AND APPLICATION OF SAI  
BRUSHES TO SAI GENERATORS DURING MID-LIFE  
BRUSH CHANGE BETWEEN OVERHAULS**

### **PURPOSE:**

To describe a procedure to be utilized in replacing and seating new brushes in a serviceable starter-generator. Brush seating is of extreme importance. If brushes are not seated prior to use, severe arcing will occur during the starting mode of operation causing damage to the commutator surface and accelerated wear. Replacement of brushes between starter-generator overhauls may be accomplished if required.

### **PROCEDURE:**

Install new SAI designed brushes in the generator. Do not use any abrasive paper to sand the commutator as the sand particles may become embedded between the commutator bars and cause accelerated brush wear.

Mount the generator securely on a bench in a horizontal position. Motorize the starter-generator by connecting the positive lead of a DC supply to starter-generator terminal C+ for a series start or B+ and A for a shunt start. Connect the negative lead of the DC supply to starter-generator terminal E-. Adjust the DC supply voltage to 15 volts. This will enable the machine to run at approximately 7000-9000 rpm for a series start, and 3000-6000 for a shunt start. The DC input amperes will be approximately 20-40 amperes for 150-250 ampere generators and approximately 30-60 amperes for 300-400 ampere generators.

To remove carbon accumulations, fan cover should be removed exposing the brush area. A portable blower or fan should be set to blow air across the brush area when the starter-generator is running. This procedure will remove the carbon dust from the starter-generator as the brushes are being seated.

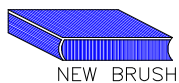
An acceptable brush seat should indicate 85-100% brush contact in the direction of rotation and at least 85% parallel to the armature shaft. Continue running the generator to achieve seating, if brush seating is unacceptable. Refer to Page 2 for typical brush seating.

Most SAI grades of brushes are instant filming types and, during the procedure of brush seating, a dark film will appear on the commutator surface. This film lowers brush friction and increases brush life.

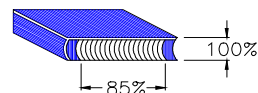
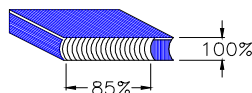
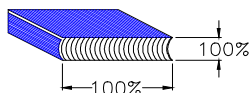
(This film does not indicate brush run-in. See above paragraph.)



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NEW BRUSH



SATISFACTORILY SEATED BRUSHES



UNSATISFACTORILY SEATED BRUSHES

LEGEND

|                                                                                     |                  |
|-------------------------------------------------------------------------------------|------------------|
|  | NON SEATED AREAS |
|  | SEATED AREAS     |

Typical Brush Seating



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## SERVICE BULLETIN NO.: SB150SG128

**SUBJECT:**            **OPTIONAL MODIFICATION OF ELIGIBLE SAI  
MODEL 200SGL SERIES STARTER-GENERATORS  
TO LONG LIFE "XL" CONFIGURATION**

**PURPOSE:**

This modification is offered to helicopter operators using SAI 200SGL series starter-generators who may require increased brush life and lower operating costs. The modification consists of a change of brushes to SAI new Long Life Part Number 200SGL1009-10. This modification must be performed as part of an overhaul as described in the pertinent starter-generator maintenance manual. Therefore, the initial installation of Long Life P/N 200SGL1009-10 brushes cannot be made in the field.

**REASON:**

Some operators of SAI 200SGL starter-generators may experience reduced brush life on some helicopter installations. Brush life can be adversely affected by many variables, including operating environment, duty cycle, starting requirements, chemical contamination, maintenance procedures, etc. For those operators, SAI is offering this new "XL" upgrade which may provide 50-100% increase in brush life. In addition, armature commutator wear can be reduced when installing the new brushes, P/N 200SGL1009-10.

**APPROVAL:**

This Service Bulletin has the approval of Skurka Aerospace Inc.

**ELIGIBILITY:**

The following model starter-generators are eligible for this modification:

200SGL111Q  
200SGL115Q  
200SGL124Q  
200SGL125Q  
200SGL130Q  
200SGL131Q  
200SGL132Q  
200SGL134Q  
200SGL146Q



#### AVAILABILITY:

The initial modification to “XL” Long Life configuration must be performed by an SAI approved Repair Station, as part of the starter-generator overhaul. For subsequent brush maintenance and overhauls, the operators may utilize their currently used facilities, and pertinent starter-generator maintenance manual.

SAI recommends maintaining the “XL” series starter-generators at one of SAI’s authorized Repair Stations.

#### IDENTIFICATION:

SAI “XL” series starter-generators are identified by (-XL) immediately following the last digit of the serial number.

- NOTE:**
1. The rewinding of the armature, replacement of the commutator, or rewinding of the stator in the “XL” series starter-generator is not recommended and will void any warranty.
  2. SAI 200SGL1009-10 brushes can only be installed in an “XL” series starter-generator. SAI 200SGL1009-10 brushes are not approved for any other starter-generators – SAI or competitive units.



**INCORRECT INSTALLATION**



**CORRECT INSTALLATION**

**Incorrect installation will result in reduction of brush life,  
reduction of Starter-Generator life and may result in  
unrepairable damage**



Skurka Aerospace Inc.  
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Camarillo, CA 93011

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## **SERVICE BULLETIN NO.: SB150SG128-1**

**SUBJECT:** **OPTIONAL MODIFICATION OF ELIGIBLE SAI  
MODEL 200SGL SERIES STARTER-GENERATORS  
TO LONG LIFE "XL2" CONFIGURATION**

### **PURPOSE:**

This modification is offered to helicopter operators using SAI 200SGL series starter-generators who may require increased brush life and lower operating costs. The modification consists of a change of brushes to SAI new Long Life "XL2" Part Number 200SGL1009-10X2. This modification must be performed as part of an overhaul as described in the pertinent starter-generator maintenance manual. Therefore, the initial installation of "XL2" P/N 200SGL1009-10X2 brushes cannot be made in the field. This modification is performed at SAI, or SAI Authorized Repair Station.

### **REASON:**

Some operators of SAI 200SGL starter-generators may experience reduced brush life on some installations. Brush life can be adversely affected by many variables, including operating environment, duty cycle, starting requirements, chemical contamination, maintenance procedures, etc. For those operators, SAI is offering this new "XL2" upgrade which may provide substantial increase in brush life. In addition, armature commutator wear can be reduced when installing the new brushes, P/N 200SGL1009-10X2.

Provided the starter-generator is overhauled at an SAI Authorized Repair Station, SAI guarantees minimum of 600 hours brush life for "XL2" series starter-generators. Many operators may experience much higher brush life.

### **APPROVAL:**

This Service Bulletin has the approval of Skurka Aerospace Inc..

### **ELIGIBILITY:**

All 200SGL series starter-generators are eligible for this modification except 200SGL119Q.



#### AVAILABILITY:

The initial modification to "XL2" Long Life configuration must be performed by an SAI approved Repair Station, as part of the starter-generator overhaul. For subsequent brush maintenance and overhauls, the operators may utilize their currently used facilities, and pertinent starter-generator maintenance manual.

#### IDENTIFICATION:

SAI "XL2" series starter-generators are identified by (-XL2) immediately following the last digit of the serial number.

- NOTE:**
1. The rewinding of the armature, replacement of the commutator, or rewinding of the stator in the "XL" series starter-generator is not recommended and will void any warranty.
  2. SAI 200SGL1009-10X2 brushes can only be installed in an "XL2" series starter-generator. SAI 200SGL1009-10X2 brushes are not approved for any other starter-generators – SAI or competitive units.



**INCORRECT INSTALLATION**



**CORRECT INSTALLATION**

**Incorrect installation will result in reduction of brush life, reduction of Starter-Generator life and may result in unrepairable damage**



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## SERVICE BULLETIN NO.: SB150SG151

JP01230

Information omitted from nameplates on 150, 160, 250, 300, 400 SG and 200, 300 SGL Series Starter Generators.

### 1. SUMMARY

A number of starter generators were shipped with incomplete nameplate marking regarding RTCA DO-160A environmental categories, mounting and/or power ratings. Supplemental nameplates which specify the omitted information can be ordered from Skurka Aerospace Inc. (SAI).

### 2. PLANNING INFORMATION.

#### A. Applicability

This Service Bulletin applies to the following Skurka Aerospace Inc. Starter-Generators:

##### 150SG Models

|             |           |           |           |
|-------------|-----------|-----------|-----------|
| 150SG117Q-3 | 150SG130Q | 150SG135Q | 150SG144Q |
| 150SG117Q-4 | 150SG133Q | 150SG142Q |           |

##### 160SG Models

|           |             |           |           |
|-----------|-------------|-----------|-----------|
| 160SG136Q | 160SG139Q   | 160SG140Q | 160SG142Q |
| 160SG137Q | 160SG139Q-2 | 160SG141Q |           |

##### 200SGL Models

|               |               |              |              |
|---------------|---------------|--------------|--------------|
| 200SGL111Q-2  | 200SGL129Q(3) | 200SGL132Q-3 | 200SGL147Q-2 |
| 200SGL111Q-3  | 200SGL129Q(4) | 200SGL138Q   | 200SGL148Q   |
| 200SGL115Q-2  | 200SGL129Q(5) | 200SGL140Q   | 200SGL149Q   |
| 200SGL119Q-2  | 200SGL130Q    | 200SGL141Q   | 200SGL149Q-2 |
| 200SGL121Q    | 200SGL130Q-2  | 200SGL142Q   | 200SGL150Q   |
| 200SGL124Q    | 200SGL131Q    | 200SGL143Q   | 200SGL151Q   |
| 200SGL126Q    | 200SGL131Q-2  | 200SGL144Q   |              |
| 200SGL129Q    | 200SGL132Q    | 200SGL145Q   |              |
| 200SGL129Q(1) | 200SGL132Q-2  | 200SGL147Q   |              |

##### 250SG Models

|             |           |             |           |
|-------------|-----------|-------------|-----------|
| 250SG111Q-2 | 250SG122Q | 250SG123Q-2 | 250SG127Q |
| 250SG120Q   | 250SG123Q | 250SG125Q   |           |

##### 300SG Models

|             |           |             |           |
|-------------|-----------|-------------|-----------|
| 300SG121Q   | 300SG125Q | 300SG129Q   | 300SG141Q |
| 300SG121Q-2 | 300SG127Q | 300SG130Q-4 |           |



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**300SGL Models**

|              |              |              |              |
|--------------|--------------|--------------|--------------|
| 300SGL111Q-2 | 300SGL127Q-3 | 300SGL138Q-5 | 300SGL146Q   |
| 300SGL114Q   | 300SGL129Q   | 300SGL138Q-6 | 300SGL146Q-2 |
| 300SGL115Q   | 300SGL129Q-2 | 300SGL139Q   | 300SGL146Q-3 |
| 300SGL116Q   | 300SGL133Q   | 300SGL140Q   | 300SGL150Q   |
| 300SGL118Q   | 300SGL137Q   | 300SGL141Q   | 300SGL152Q   |
| 300SGL126Q   | 300SGL138Q   | 300SGL142Q   | 300SGL153Q   |
| 300SGL126Q-2 | 300SGL138Q-2 | 300SGL144Q   | 300SGL157Q   |
| 300SGL127Q-1 | 300SGL138Q-4 | 300SGL145Q   | 300SGL158Q   |

**400SG Models**

|             |             |             |           |
|-------------|-------------|-------------|-----------|
| 400SG111Q-1 | 400SG129Q   | 400SG146Q   | 400SG165Q |
| 400SG111Q-4 | 400SG134Q   | 400SG147Q   | 400SG166Q |
| 400SG115Q   | 400SG135Q   | 400SG148Q   | 400SG168Q |
| 400SG119Q   | 400SG137Q   | 400SG155Q   | 400SG173Q |
| 400SG121Q   | 400SG139Q   | 400SG157Q   | 400SG176Q |
| 400SG126Q   | 400SG142Q   | 400SG160Q   |           |
| 400SG127Q   | 400SG143Q-1 | 400SG162Q   |           |
| 400SG128Q   | 400SG143Q-4 | 400SG163Q-2 |           |

**B. Reason**

To bring starter generators into compliance with marking requirements per TSO-C56a/RTCA DO-160A.

**C. Description.**

This Service Bulletin provides instructions on ordering supplemental nameplates and their installation.

**D. Compliance.**

This Service Bulletin shall be accomplished at the next overhaul or service of the starter generator, but may also be performed at any time the unit is accessible. It has no effect on product performance or flight safety.

**E. Approval.**

This Service Bulletin has been shown to comply with the applicable Federal Aviation Regulations and is FAA approved for the Starter Generator.

**F. Man-hours Required.**

Approximately 2 - 5 minutes.

**G. Weight and Balance.**

Not affected.

**H. Electrical Load Data.**

Not Changed.



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I. References.

TM101 150SG Series Starter-Generator Overhaul Manual  
TM102 160SG Series Starter-Generator Overhaul Manual  
TM105A 200SGL Series Starter-Generator Overhaul Manual  
TM107 250SG Series Starter-Generator Overhaul Manual  
TM108 300SG Series Starter-Generator Overhaul Manual  
TM109 300SGL Series Starter-Generator Overhaul Manual  
TM110 400SG Series Starter-Generator Overhaul Manual  
TM112 200SGL149Q Series Starter-Generator Overhaul Manual

J. Other Publications Affected.

None.

K. Interchangeability.

None.

3. ACCOMPLISHMENT INSTRUCTIONS

- A. To order the appropriate supplemental nameplate for your starter generator, contact Skurka Aerospace Inc, Customer Service Representative, at: (805) 484-8884.

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U.S.A.

- B. Use isopropyl alcohol to clean the area on the starter generator adjacent to the original nameplate where the supplemental nameplate will be placed. Affix supplemental nameplate to the starter generator.

4. MATERIAL INFORMATION.

See Table 1 for a list of starter generator model numbers and corresponding nameplate part numbers.

Example: To order the correct label for the 150SG117Q-3 starter generator, order 150SG1092-29001.



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Table 1  
 SG Model Number to Supplemental Label  
 Cross-Reference

| Starter<br>Generator<br>Model No. | Label<br>Part No.<br>150SG1092-29 | Starter<br>Generator<br>Model No. | Label<br>Part No.<br>150SG1092-29 | Starter<br>Generator<br>Model No. | Label<br>Part No.<br>150SG1092-29 |
|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| 150SG117Q-3                       | 001                               | 200SGL147Q-2                      | 042                               | 300SGL141Q                        | 082                               |
| 150SG117Q-4                       | 002                               | 200SGL148Q                        | 043                               | 300SGL142Q                        | 083                               |
| 150SG130Q                         | 003                               | 200SGL149Q                        | 044                               | 300SGL144Q                        | 084                               |
| 150SG133Q                         | 004                               | 200SGL149Q-2                      | 045                               | 300SGL145Q                        | 085                               |
| 150SG135Q                         | 005                               | 200SGL150Q                        | 046                               | 300SGL146Q                        | 086                               |
| 150SG142Q                         | 006                               | 200SGL151Q                        | 047                               | 300SGL146Q-2                      | 087                               |
| 150SG144Q                         | 007                               |                                   |                                   | 300SGL146Q-3                      | 088                               |
|                                   |                                   | 250SG111Q-2                       | 048                               | 300SGL150Q                        | 089                               |
| 160SG136Q                         | 008                               | 250SG120Q                         | 049                               | 300SGL152Q                        | 090                               |
| 160SG137Q                         | 009                               | 250SG122Q                         | 050                               | 300SGL153Q                        | 091                               |
| 160SG139Q                         | 010                               | 250SG123Q                         | 051                               | 300SGL157Q                        | 092                               |
| 160SG139Q-2                       | 011                               | 250SG123Q-2                       | 052                               | 300SGL158Q                        | 093                               |
| 160SG140Q                         | 012                               | 250SG125Q                         | 053                               |                                   |                                   |
| 160SG141Q                         | 013                               | 250SG127Q                         | 054                               | 400SG111Q-1                       | 094                               |
| 160SG142Q                         | 014                               |                                   |                                   | 400SG111Q-4                       | 095                               |
|                                   |                                   | 300SG121Q                         | 055                               | 400SG115Q                         | 096                               |
| 200SGL111Q-2                      | 015                               | 300SG121Q-2                       | 056                               | 400SG119Q                         | 097                               |
| 200SGL111Q-3                      | 016                               | 300SG125Q                         | 057                               | 400SG121Q                         | 098                               |
| 200SGL115Q-2                      | 017                               | 300SG127Q                         | 058                               | 400SG126Q                         | 099                               |
| 200SGL119Q-2                      | 018                               | 300SG129Q                         | 059                               | 400SG127Q                         | 100                               |
| 200SGL121Q                        | 019                               | 300SG130Q-4                       | 060                               | 400SG128Q                         | 101                               |
| 200SGL124Q                        | 020                               | 300SG141Q                         | 061                               | 400SG129Q                         | 102                               |
| 200SGL126Q                        | 021                               |                                   |                                   | 400SG134Q                         | 103                               |
| 200SGL129Q                        | 022                               | 300SGL111Q-2                      | 062                               | 400SG135Q                         | 104                               |
| 200SGL129Q(1)                     | 023                               | 300SGL114Q                        | 063                               | 400SG137Q                         | 105                               |
| 200SGL129Q(3)                     | 024                               | 300SGL115Q                        | 064                               | 400SG139Q                         | 106                               |
| 200SGL129Q(4)                     | 025                               | 300SGL116Q                        | 065                               | 400SG142Q                         | 107                               |
| 200SGL129Q(5)                     | 026                               | 300SGL118Q                        | 066                               | 400SG143Q-1                       | 108                               |
| 200SGL130Q                        | 027                               | 300SGL126Q                        | 067                               | 400SG143Q-4                       | 109                               |
| 200SGL130Q-2                      | 028                               | 300SGL126Q-2                      | 068                               | 400SG146Q                         | 110                               |
| 200SGL131Q                        | 029                               | 300SGL127Q-1                      | 069                               | 400SG147Q                         | 111                               |
| 200SGL131Q-2                      | 030                               | 300SGL127Q-3                      | 070                               | 400SG148Q                         | 112                               |
| 200SGL132Q                        | 031                               | 300SGL129Q                        | 071                               | 400SG155Q                         | 113                               |
| 200SGL132Q-2                      | 032                               | 300SGL129Q-2                      | 072                               | 400SG157Q                         | 114                               |
| 200SGL132Q-3                      | 033                               | 300SGL133Q                        | 073                               | 400SG160Q                         | 115                               |
| 200SGL138Q                        | 034                               | 300SGL137Q                        | 074                               | 400SG162Q                         | 116                               |
| 200SGL140Q                        | 035                               | 300SGL138Q                        | 075                               | 400SG163Q-2                       | 117                               |
| 200SGL141Q                        | 036                               | 300SGL138Q-2                      | 076                               | 400SG165Q                         | 118                               |
| 200SGL142Q                        | 037                               | 300SGL138Q-4                      | 077                               | 400SG166Q                         | 119                               |
| 200SGL143Q                        | 038                               | 300SGL138Q-5                      | 078                               | 400SG168Q                         | 120                               |
| 200SGL144Q                        | 039                               | 300SGL138Q-6                      | 079                               | 400SG173Q                         | 121                               |
| 200SGL145Q                        | 040                               | 300SGL139Q                        | 080                               | 400SG176Q                         | 122                               |
| 200SGL147Q                        | 041                               | 300SGL140Q                        | 081                               |                                   |                                   |



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# SERVICE BULLETIN

Modification of Skurka Aerospace Inc. Starter-Generator P/N 200SGL147Q-2 to 200SGL147Q-3.

1. SUMMARY

This new application will provide upgrade to higher temperature grease in starter generator bearings for greater reliability. This bulletin provides authorization to upgrade starter generator.

2. PLANNING INFORMATION.

A. Effectivity.

This Service Bulletin applies to Skurka Aerospace Inc. Starter-Generator P/N 200SGL147Q-2.

B. Reason.

(1) Problem:

Insufficient bearing lubrication at elevated temperatures.

(2) Cause:

Current bearing grease flows too easily out of bearings at operating temperatures of starter generator.

(3) Solution:

Upgrade starter generator to bearings packed with high temperature grease.

C. Description.

This Service Bulletin provides instructions to upgrade Starter Generator P/N 200SGL147Q-2 to 200SGL147Q-3.

D. Compliance.

It is recommended that this Service Bulletin be performed when approved or required.



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# SERVICE BULLETIN

## PLANNING INFORMATION.(Continued)

E. Approval.

This Service Bulletin has been shown to comply with the applicable Federal Aviation Regulations and is FAA approved for the Starter Generator.

F. Man-hours Required.

No additional time required when doing overhaul.



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## SERVICE BULLETIN

G. Weight and Balance.

Not affected.

H. Electrical Load Data.

Not Changed.

I. References.

TM105A 200SGL Series Starter-Generator Overhaul Manual

J. Other Publications Affected.

None.

K. Interchangeability.

Not Applicable.

### 3. ACCOMPLISHMENT INSTRUCTIONS

A. Disassembly Procedure.

Disassemble per TM105A, 200SGL Series Starter-Generator Overhaul Manual

B. Assembly Procedure.

Assemble per TM105A, 200SGL Series Starter-Generator Overhaul Manual

C. Reidentify Starter Generator.

(1) Metal stamp a line through '-2' on the identification label.

(2) Metal stamp '-3' on the label to indicate the upgrade of starter generator 200SGL147Q-2 to 200SGL147Q-3.

OR

Replace identification plate per below.

D. Test starter generator in accordance with TM105A.



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# SERVICE BULLETIN

## 4. MATERIAL INFORMATION.

| New P/N       | Qty | Nomenclature     | Old P/N        | Disposition |
|---------------|-----|------------------|----------------|-------------|
| 200SGL1092-72 | 1   | I. D. Plate      | 200SGL1092-57  | Replace     |
| 150SG1052-1   | 1   | A. Drive Bearing | 150SG1052-B    | Replace     |
| 200SGL1052-5  | 1   | Drive Bearing    | 200SGL1052-1-B | Replace     |



# SERVICE BULLETIN

Modification of Skurka Aerospace Inc Starter-Generator P/N 200SGL119Q-2.

1. SUMMARY

This new application will provide an upgrade to higher tension Belleville Springs for greater reliability. This bulletin provides authorization to upgrade the above referenced Starter-Generator.

2. PLANNING INFORMATION.

A. Effectivity.

This Service Bulletin applies to Skurka Aerospace Inc. Starter-Generator P/N 200SGL119Q-2.

B. Reason.

(1) Problem:

Uniformity of tension on the friction disk through life of Starter-Generator.

(2) Cause:

Current Belleville Springs may not maintain consistent uniform tension.

(3) Solution:

Upgrade to higher tension Belleville Springs on Starter-Generator 200SGL119Q-2.

C. Description.

This Service Bulletin provides instructions to upgrade Starter Generator P/N 200SGL119Q-2.

D. Compliance.

This Service Bulletin will be accomplished at the next overhaul.

E. Approval.

This Service Bulletin has been shown to comply with the applicable Federal Aviation Regulations and is FAA approved for the Starter-Generator.

F. Man-hours Required.

No additional time required when doing overhaul.



# SERVICE BULLETIN

G. Weight and Balance.

Not affected.

H. Electrical Load Data.

Not Changed.

I. References.

TM105A, 200SGL Series Starter-Generator Overhaul Manual

J. Other Publications Affected.

None.

K. Interchangeability.

Not Applicable.

## 3. ACCOMPLISHMENT INSTRUCTIONS

A. Disassembly Procedure.

Disassemble per TM105A, 200SGL Series Starter-Generator Overhaul Manual.

B. Assembly Procedure.

Follow TM105A, 200SGL Series Starter-Generator Overhaul Manual except:

- (1) Previous Belleville Springs will be replaced with P/N 250SG1093 in a quantity of 3 per unit. The first Belleville Spring will be inserted dome side up. The second Belleville Spring will be inserted dome side down. The third Belleville Spring will be inserted dome side up. They will be seated and backed off 3/4 turn.

C. Reidentify Starter-Generator.

Metal stamp 'X' in the #4 Position on the Modification Status decal.

D. Test Starter-Generator in accordance with TM105A.



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# SERVICE BULLETIN

## 4. MATERIAL INFORMATION.

| <u>New P/N</u> | <u>Qty</u> | <u>Nomenclature</u>       | <u>Old P/N</u> | <u>Disposition</u> |
|----------------|------------|---------------------------|----------------|--------------------|
| 250SG1093      | 3          | Belleville Spring         | 200SGL1093     | Replace            |
| 400SG1380      | 1          | Modification Status Decal |                |                    |



# SERVICE BULLETIN

Assembly checks of Skurka Aerospace Inc. Starter-Generator P/N 200SGL130Q.

1. SUMMARY

This Service Bulletin provides direction to properly assemble and tension the damping system on SAI starter-generator 200SGL130Q.

2. PLANNING INFORMATION.

A. Effectivity.

This Service Bulletin applies to Skurka Aerospace Inc. Starter-Generator P/N 200SGL130Q. This Service Bulletin is valid and shall be kept in the back of SAI CMM TM105A.

B. Reason.

(1) Problem:

Improperly assembled and tensioned damping systems have been noted during field inspection.

(2) Cause:

More clarity and detail to the damping assembly and tensioning is required to clarify procedure and adjustment check.

(3) Solution:

A new adjustment procedure has been defined to provide consistency to SAI starter generator damping assembly.

C. Description.

This Service Bulletin provides direction to disassemble and assemble the damping system, replace the Belleville springs and the self-locking drive shaft nut, and properly adjust and check the damping system.

D. Compliance.

SAI RENDERS COMPLIANCE WITH THIS SERVICE BULLETIN, MANDATORY. WORK SHALL BE ACCOMPLISHED BY 05-06-09 ON UNITS NOT IDENTIFIED "004" PER FIGURES 4 AND 4A AND ANY SUBSEQUENT MAINTENANCE ACTIVITY INVOLVING DAMPING SYSTEM DISASSEMBLY.



# SERVICE BULLETIN

E. Approval.

This Service Bulletin has been shown to comply with the applicable Federal Aviation Regulations and is FAA approved for the 200SGL130Q starter generator.

F. Man-hours Required.

- (1) No additional time required when done at overhaul.
- (2) 1 Mechanic / 0.5 hours at inspection.

G. Weight and Balance.

Not affected.

H. Electrical Load Data.

Not Changed.

I. References.

TM105A 200SGL Series Starter-Generator Overhaul Manual

J. Other Publications Affected.

None.

K. Interchangeability.

None.

3. ACCOMPLISHMENT INSTRUCTIONS

A. Disassembly Procedure.

- (1) Remove fan cover.
- (2) Lay down starter-generator in the horizontal position on a stable workbench. Remove and discard drive shaft nut 150SG1071 and Belleville springs 200SGL1093. See Figure 1.



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# SERVICE BULLETIN

B. Assembly Procedure.

- (1) Install fan assembly 200SGL1107 with new Belleville springs 200SGL1093 and drive shaft nut 150SG1071. See Figure 1 for correct orientation of Belleville springs.
- (2) Make sure the shaft damping system is correctly aligned. See Figure 2.



# SERVICE BULLETIN

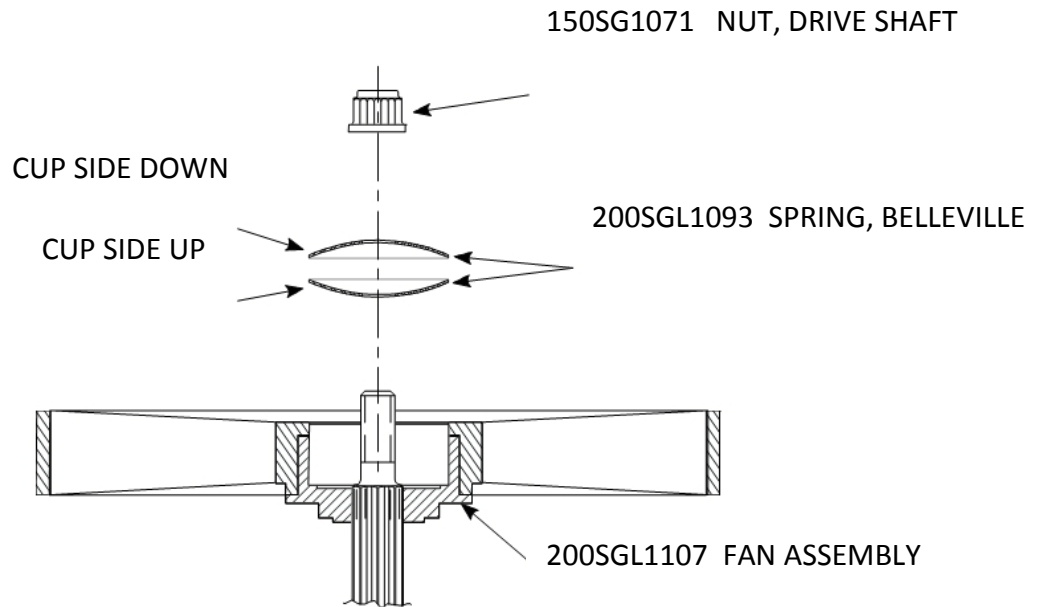
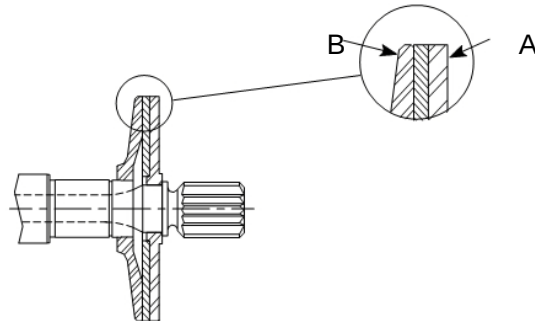


Figure 1  
Belleville Spring Installation Instructions

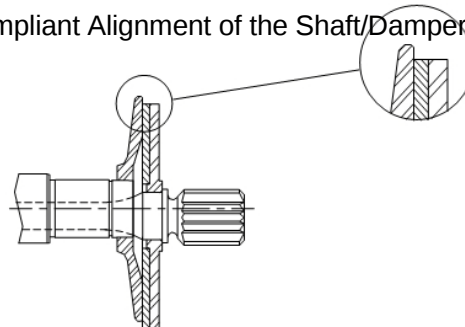


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# SERVICE BULLETIN



Compliant Alignment of the Shaft/Damper Assembly



Non-compliant Alignment of the Shaft/Damper Assembly

Figure 2  
Alignment of Starter-Generators



## SERVICE BULLETIN

- (3) Use a fixed-type ratchet to tighten drive shaft nut so that it just contacts Belleville springs.
- (4) Using a support to avoid any stress on the shaft, put the starter-generator in the vertical position with the fan at the top.
- (5) Hold the external part of the fan assembly and use a calibrated torque wrench to tighten the drive shaft nut to 30 lb.in. (3.4 N.m.) maximum.
- (6) Loosen drive shaft nut by one-half turn (180°).
- (7) Tighten drive shaft nut by one-eighth turn (45°).
- (8) Fit the fan cover and reinstall screws. Secure the fan cover.
- (9) Check for radial movement of the splined shaft to verify the damping system is not in a locked position. See Figure 3. If needed, realign the assembly as shown in Figure 2.

NOTE: A locked damping system is indicated when disk "A" in Figure 2 cannot be moved with respect to disk "B" when checking for radial movement.



Figure 3  
Radial Movement Check



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## SERVICE BULLETIN

- (10) Punch-mark "004" on the I.D. Plate in location shown in Figures 4 and 4A, if not already stamped.

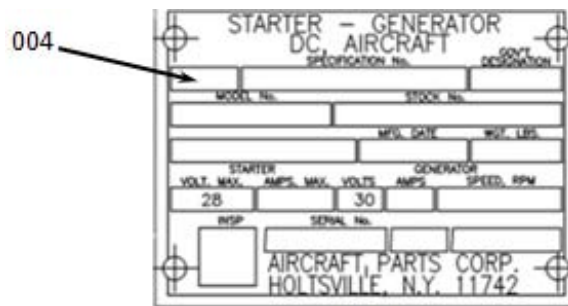


Fig. 4  
(Aircraft Parts Corp.)

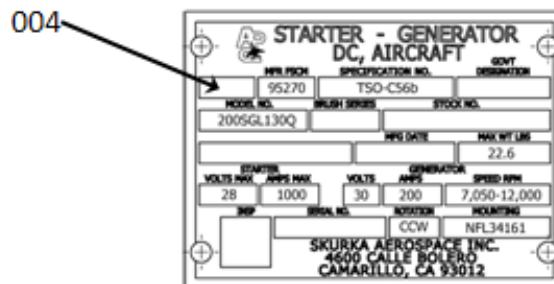


Fig. 4A  
(Skurka Aerospace Inc.)



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# SERVICE BULLETIN

## 4. MATERIAL INFORMATION

| SAI P/N    | Qty | Nomenclature      |
|------------|-----|-------------------|
| 150SG1071  | 1   | Drive Shaft Nut   |
| 200SGL1093 | 2   | Belleville Spring |



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# SERVICE BULLETIN

Assembly checks of Skurka Aerospace Inc. Starter-Generator P/N 200SGL115Q-2.

1. SUMMARY

This Service Bulletin provides direction to properly assemble and tension the damping system on SAI starter-generator 200SGL115Q-2.

2. PLANNING INFORMATION.

A. Effectivity.

This Service Bulletin applies to Skurka Aerospace Inc. Starter-Generator P/N 200SGL115Q-2. This Service Bulletin is valid until requirements are incorporated in SAI CMM TM105A. Accomplishment of this Service Bulletin is identified by "X" under the number "1" on the modification status decal P/N 400SG1380.

Starter generators with manufacturing dates of July 2009 and later, as identified in their nameplates, have this Service Bulletin incorporated

B. Reason.

(1) Problem:

Improperly assembled and tensioned damping systems have been noted during field inspection.

(2) Cause:

More clarity and detail to the damping assembly and tensioning is required to clarify procedure and adjustment check.

(3) Solution:

A new adjustment procedure has been defined to provide consistency to SAI starter-generator damping assembly.

C. Description.

This Service Bulletin provides direction to disassemble and assemble the damping system, replace the Belleville springs and the self-locking drive shaft nut, and properly adjust and check the damping system.

D. Compliance.

**SAI RENDERS COMPLIANCE WITH THIS SERVICE BULLETIN, MANDATORY. WORK SHALL BE ACCOMPLISHED BY 31 DECEMBER, 2009 AND ANY SUBSEQUENT MAINTENANCE ACTIVITY INVOLVING DAMPING SYSTEM DISASSEMBLY.**



# SERVICE BULLETIN

E. Approval.

This Service Bulletin has been shown to comply with the applicable Federal Aviation Regulations and is FAA approved for the 200SGL115Q-2 starter generator.

F. Man-hours Required.

- (1) No additional time required when done at overhaul.
- (2) 1 Mechanic / 0.5 hours at inspection.

G. Weight and Balance.

Not affected.

H. Electrical Load Data.

Not Changed.

I. References.

TM105A 200SGL Series Starter-Generator Overhaul Manual

J. Other Publications Affected.

None.

K. Interchangeability.

None.

3. ACCOMPLISHMENT INSTRUCTIONS

A. Disassembly Procedure.

- (1) Remove fan cover; save cover screws for reinstallation of fan cover
- (2) Lay down starter-generator in the horizontal position on a stable workbench. Lock the starter generator shaft with a spline wrench or similar tool so as to prevent shaft rotation without damaging the shaft spline. Remove and discard drive shaft nut 150SG1071 and Belleville springs 200SGL1093. See Figure 1.

B. Assembly Procedure.

- (1) Install fan assembly 200SGL1107-2 with new Belleville springs 200SGL1093 and drive shaft nut 150SG1071. See Figure 1 for correct orientation of Belleville springs.



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## SERVICE BULLETIN

- (2) Make sure the shaft damping system is correctly aligned. See Figure 2.

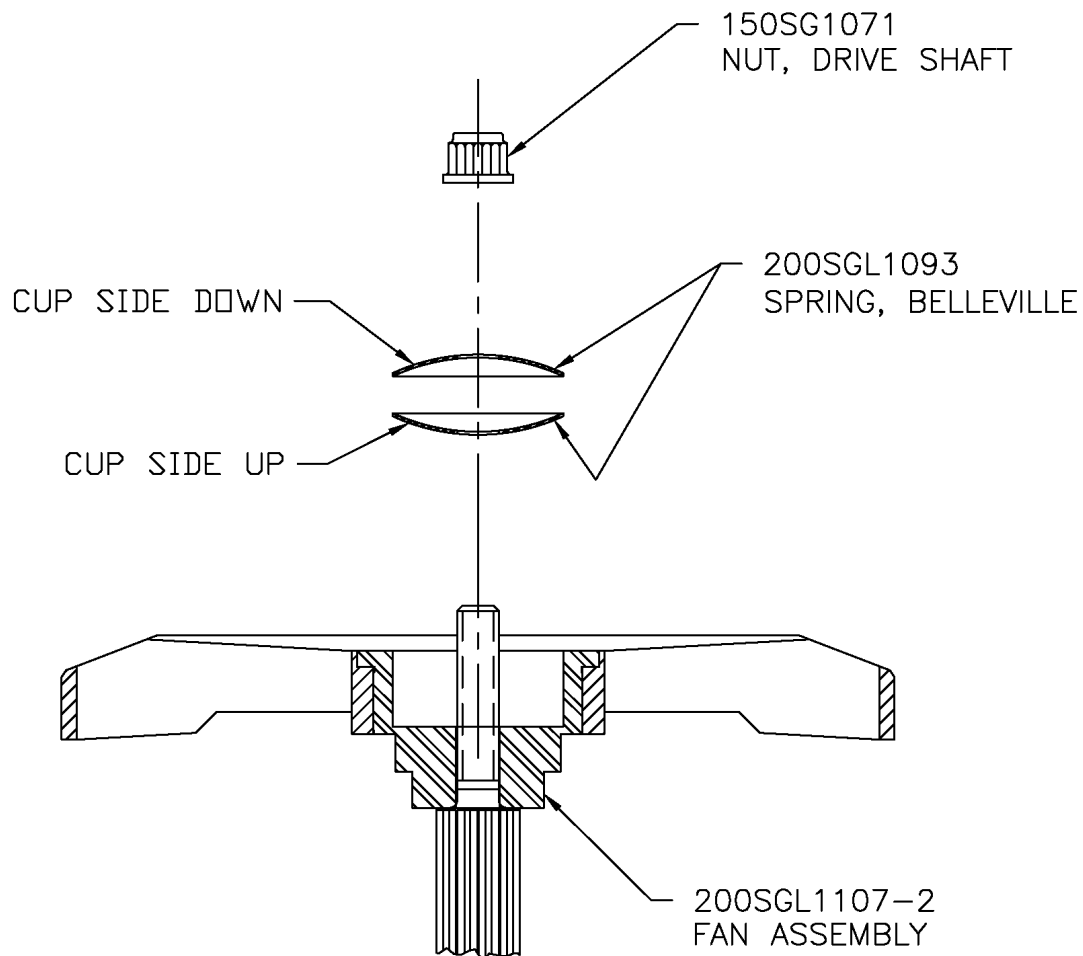


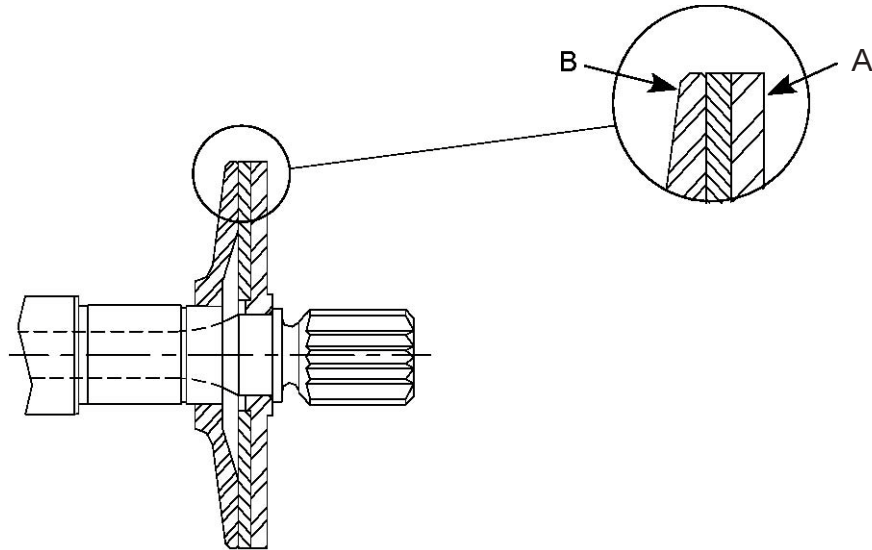
Figure 1

Belleville Spring Installation Instructions

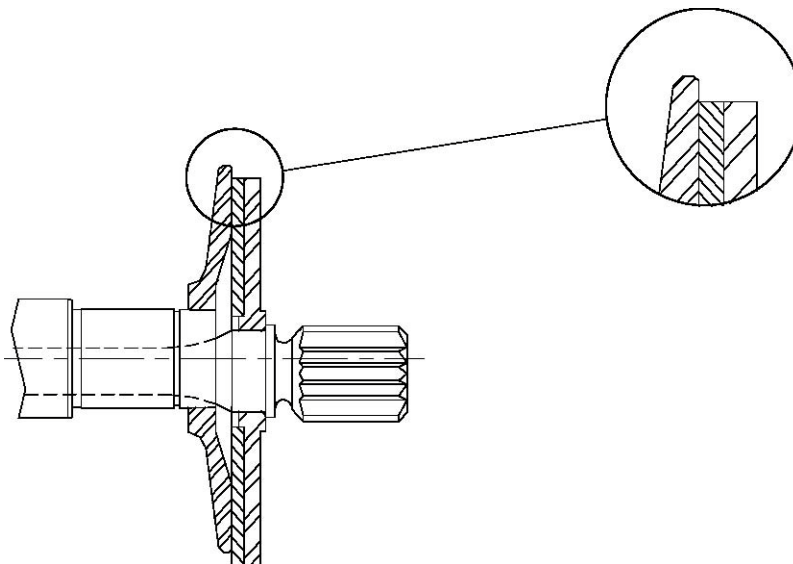


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Compliant Alignment of the Shaft/Damper Assembly



**Noncompliant Alignment of the Shaft/Dampener Assembly**

Figure 2  
Alignment of Starter-Generators



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## SERVICE BULLETIN

- (3) Use a fixed-type ratchet to tighten drive shaft nut so that it just contacts Belleville springs.
- (4) Using a support to avoid any stress on the shaft, put the starter-generator in the vertical position with the fan at the top.
- (5) Hold the external part of the fan assembly and use a calibrated torque wrench to tighten the drive shaft nut to 30 lb-in. (3.4 Nm.) maximum.
- (6) Loosen drive shaft nut by one-half turn (180°).
- (7) Tighten drive shaft nut by one-eighth turn (45°).
- (8) Fit the fan cover and reinstall screws. Secure the fan cover.
- (9) Check for radial movement of the splined shaft to verify the damping system is not in a locked position. See Figure 3. If needed, realign the assembly as shown in Figure 2.

NOTE: A locked damping system is indicated when Drive Damper Plate "A" in Figure 2 cannot be moved with respect to Armature Damper Plate "B" when checking for radial movement.



**Figure 3**  
**Radial Measurement Check**



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(10) Add new Modification Status Decal, P/N 400SG1380 next to the nameplate as shown in Figure 4.

C. Reidentify Starter Generator.

Metal Stamp "X" in the # 1 Position on the Modification Status Decal as shown in Figure 4.

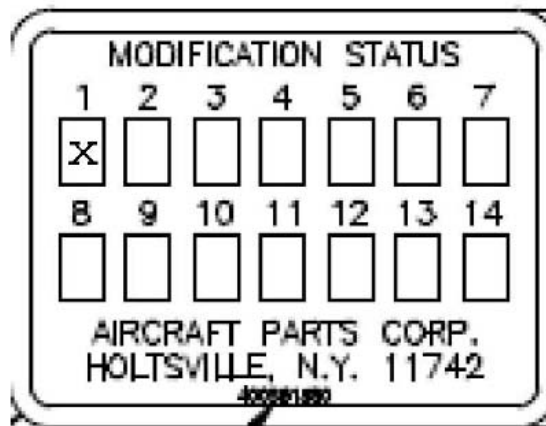


Figure 4  
Modification Status Decal

### c. MATERIAL INFORMATION

| SAI P/N             | QTY | Nomenclature      |
|---------------------|-----|-------------------|
| 150SG1071           | 1   | Drive Shaft Nut   |
| 200SG1093           | 2   | Belleville Spring |
| 200SGL1092-41 Rev E | 1   | I.D. Plate        |



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# SERVICE BULLETIN

Assembly Checks of Skurka Aerospace Inc. Starter-Generator P/N 200SGL144Q.

## 1. SUMMARY

This Service Bulletin provides direction to properly assemble and tension the damping system on SAI starter-generator 200SGL144Q.

## 2. PLANNING INFORMATION.

### A. Effectivity.

This Service Bulletin applies to Skurka Aerospace Inc. Starter-Generator P/N 200SGL144Q. This Service Bulletin is valid until requirements are incorporated in SAI CMM TM105A. Accomplishment of this Service bulletin is identified by "X" under the number "1" on the modification status decal P/N 400SG1380.

Starter generators with manufacturing dates of July 2009 and later, as identified in their nameplates, have this Service Bulletin incorporated.

### B. Reason.

#### (1) Problem:

Improperly assembled and tensioned damping systems have been noted during field inspection.

#### (2) Cause:

More clarity and detail to the damping assembly and tensioning is required to clarify procedure and adjustment check.

#### (3) Solution:

A new adjustment procedure has been defined to provide consistency to SAI starter-generator damping assembly.

### C. Description.

This Service Bulletin provides direction to disassemble and assemble the damping system, replace the Belleville springs and the self-locking drive shaft nut, and properly adjust and check the damping system.

### D. Compliance.

**SAI RENDERS COMPLIANCE WITH THIS SERVICE BULLETIN, MANDATORY. WORK SHALL BE ACCOMPLISHED BY 31 DECEMBER, 2009 AND ANY SUBSEQUENT MAINTENANCE ACTIVITY INVOLVING DAMPING SYSTEM DISASSEMBLY.**



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# SERVICE BULLETIN

E. Approval.

This Service Bulletin has been shown to comply with the applicable Federal Aviation Regulations and is FAA approved for the 200SGL144Q starter generator.

F. Man-hours Required.

- (1) No additional time required when done at overhaul.
- (2) 1 Mechanic / 0.5 hours at inspection.

G. Weight and Balance.

Not affected.

H. Electrical Load Data.

Not Changed.

I. References.

TM105A 200SGL Series Starter-Generator Overhaul Manual

J. Other Publications Affected.

None.

K. Interchangeability.

None.

3. ACCOMPLISHMENT INSTRUCTIONS

A. Disassembly Procedure.

- (1) Remove fan cover; save screws for reinstallation of fan cover.
- (2) Lay down the starter-generator in the horizontal position on a stable workbench. Lock the starter generator shaft with a spline wrench or similar tool so as to prevent shaft rotation without damaging the spline shaft. Remove and discard drive shaft nut 150SG1071 and Belleville springs 200SGL1093. See Figure 1.

B. Assembly Procedure.

- (1) Install fan assembly 200SGL1107-2 with new Belleville springs 200SGL1093 and drive shaft nut 150SG1071. See Figure 1 for correct orientation of Belleville springs.
- (2) Make sure the shaft damping system is correctly aligned. See Figure 2.



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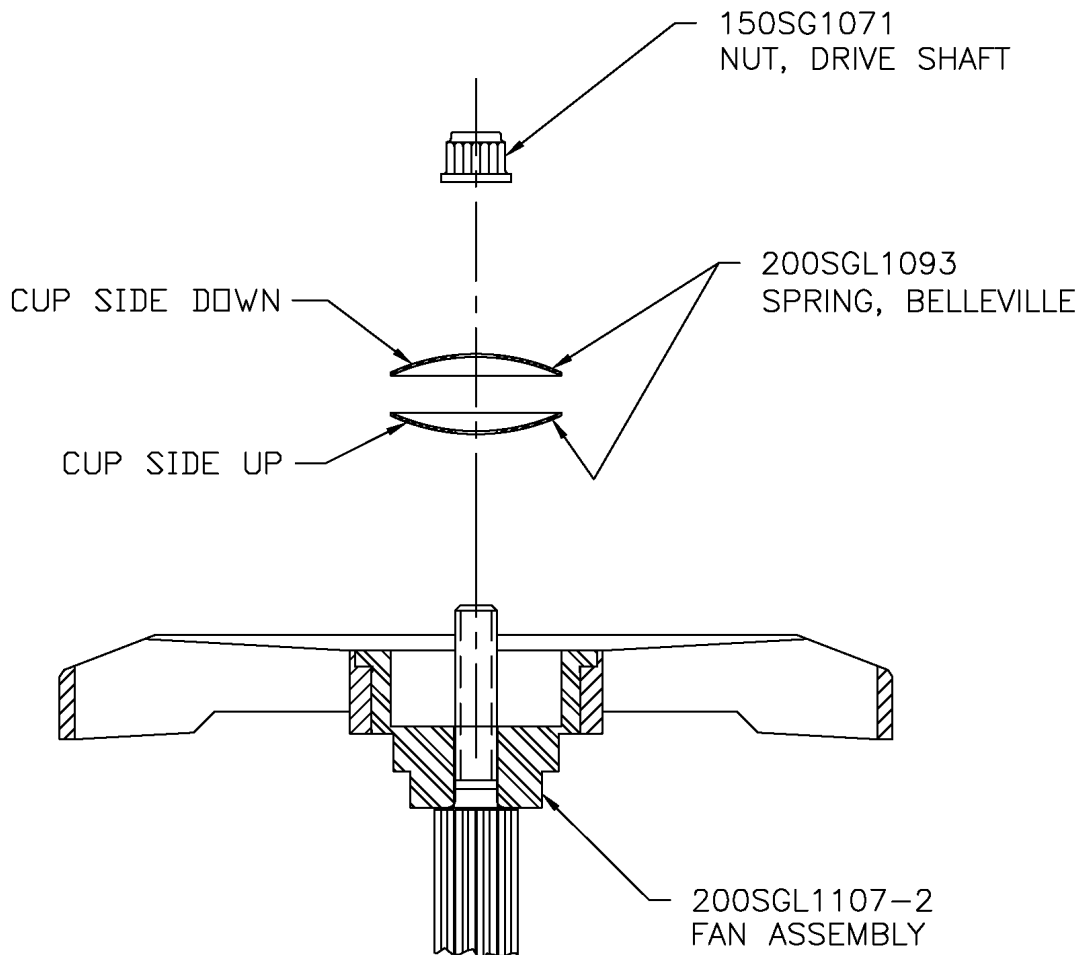
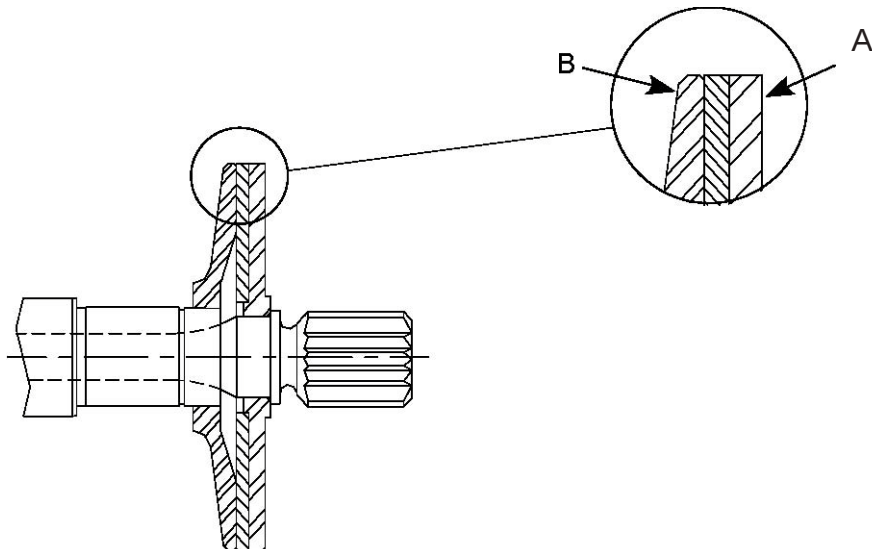


Figure 1

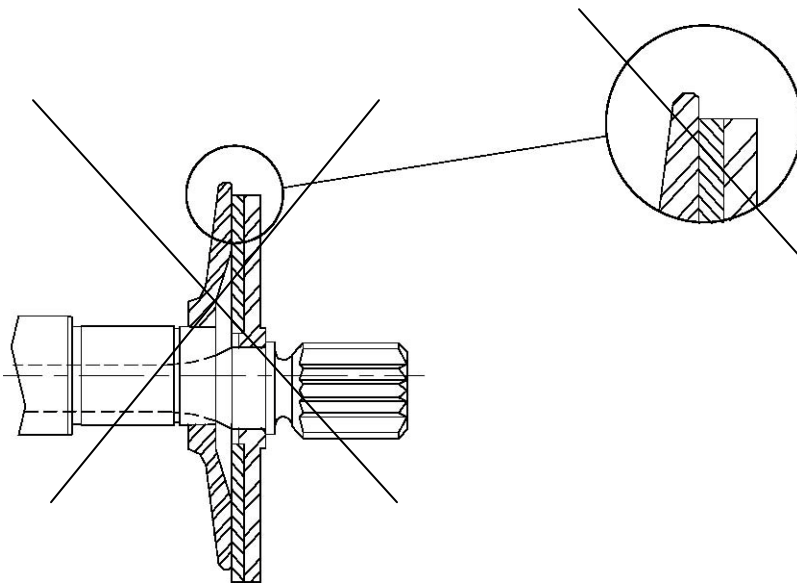
**Belleville Spring Installation Instructions**



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Compliant Alignment of the Shaft/Damper Assembly



**Noncompliant Alignment of the Shaft/Damper Assembly**

Figure 2  
Shaft/Damper Assembly Alignment



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## SERVICE BULLETIN

- (3) Use a fixed-type ratchet to tighten drive shaft nut so that it just contacts Belleville springs.
- (4) Using a support to avoid any stress on the shaft, put the starter-generator in the vertical position with the fan at the top.
- (5) Hold the external part of the fan assembly and use a calibrated torque wrench to tighten the drive shaft nut to 30 lb-in. (3.4 Nm.) maximum.
- (6) Loosen drive shaft nut by one-half turn (180°).
- (7) Tighten drive shaft nut by one-eighth turn (45°).
- (8) Fit the fan cover and reinstall screws. Secure the fan cover.
- (9) Check for radial movement of the splined shaft to verify the damping system is not in a locked position. See Figure 3. If needed, realign the assembly as shown in Figure 2.

NOTE: A locked damping system is indicated when Drive damper Plate "A" in Figure 2 cannot be moved with respect to Armature Damper Plate "B" when checking for radial movement.



**Figure 3**  
**Radial Measurement Check**



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## SERVICE BULLETIN

- 10) Add new Modification Status Decal, P/N 400SG1380 next to the nameplate as shown in Figure 4.

### C. Reidentify Starter Generator.

Metal Stamp "X" in the #1 Position on the Modification Status Decal as shown in Figure 4.

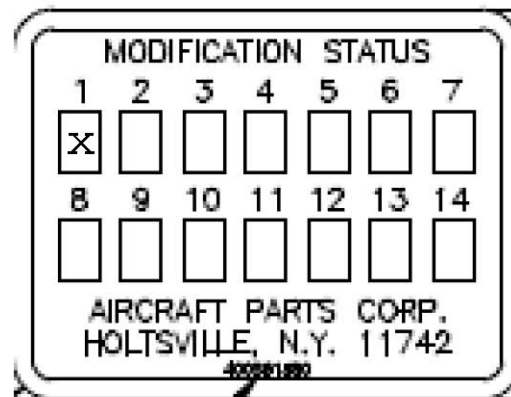


Figure 4  
Modification Status Decal

### 3. MATERIAL INFORMATION

| SAI P/N    | QTY | Nomenclature              |
|------------|-----|---------------------------|
| 150SG1071  | 1   | Drive Shaft Nut           |
| 200SGL1093 | 2   | Belleville Spring         |
| 400SG1380  | 1   | Modification Status Decal |



# SERVICE BULLETIN

## TM 105A--Reversion to Revision Level 7 from Revision 8

### 1. SUMMARY

This Service Bulletin is issued to alleviate confusion among users of Skurka Aerospace Inc manual TM 105A with respect to the differences in the content of Revision 7 and Revision 8.

### 2. PLANNING INFORMATION

#### A. Effectivity

This Service Bulletin applies to Skurka Aerospace Inc manual TM 105A, Revision 8 for starter generators of the 200SGL series.

#### B. Reason.

##### (1) Problem:

Confusion among users of manual TM 105A concerning the differences in content between Revision 7 and Revision 8.

##### (2) Cause:

Omission of revision change descriptions from manual TM 105A Revision 8.

##### (3) Solution:

Reversion of manual TM 105A to Revision level 7 pending completion of Revision 9, which will detail the differences between Revision 7 and Revision 8 and also include other changes as needed.

#### C. Description

The Revision Description section of manual TM 105A detailing the differences between Revisions 7 and 8 was omitted in the release of Revision 8. This has created some confusion among users in the field as to the exact nature of changes.

Please revert to the usage of the language contained in Revision 7 of manual TM 105A. A compilation of changes between Revisions 7 and 8 will be incorporated in upcoming Revision 9 along with other changes as needed.

(Continued on next page)



# SERVICE BULLETIN

TM 105A-Reversion to Revision Level 7 from Revision 8

(Continued from previous page)

## 2. PLANNING INFORMATION

### D. Compliance

As of the effective date of this Service Bulletin, manual TM 105A Revision 7 will be available on the Skurka Aerospace Inc web site at <http://www.APC-ai2.com/>. Revision 8 will be removed from the SAI web site and any copies should be destroyed. Subscribers should follow their regular logging in and selection procedures to gain access and download the manual for use.

Questions or difficulties concerning the website should be forwarded to Skurka Aerospace Inc Technical Publications section, phone number (316) 943-8600 or by e-mail to [hduke@skurka-aero.com](mailto:hduke@skurka-aero.com).

NOTE: SAI CONSIDERS COMPLIANCE WITH THIS SERVICE BULLETIN  
MANDATORY.

### E. Approval.

This Service Bulletin has been shown to comply with the applicable Federal Aviation Regulations and is FAA approved for the starter generators covered by TM 105A.

### F. Man-hours Required

None

### G. Weight and Balance.

Not affected.

### H. Electrical Load Data.

Not Changed.

### References.

TM105A 200SGL Series Starter-Generator Overhaul Manual

### J. Other Publications Affected.

None.

(Continued on next page)



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# SERVICE BULLETIN

TM 105A-Reversion to Revision Level 7 from Revision 8

(Continued from previous page)

K. Interchangeability.

None.

3. ACCOMPLISHMENT INSTRUCTIONS

See Planning Information (2) (D) of this Service Bulletin

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## SECTION IX

### SERVICE LETTERS

| SL # AND REVISION<br>STATUS | SUBJECT                                         |
|-----------------------------|-------------------------------------------------|
| 132 Rev. B                  | Calculating Brush Life                          |
| 134 Rev. B                  | Drive Shaft Alignment                           |
| 173 Rev. A                  | Acceptance Test Data Sheet Format               |
| 192 Rev. A                  | Model 200SGL132Q-3—Updating<br>Label for “-XL2” |



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**Camarillo, CA 93011**

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## **SERVICE LETTER NO.: SL132**

**TO: ALL HOLDERS OF SAI 200SGL SERIES STARTER-GENERATORS**

**SUBJECT: DATA WHICH WILL ALLOW YOU TO CALCULATE YOUR BRUSH LIFE  
FOR YOUR SAI STARTER-GENERATORS**

---

We have found that repeated brush inspections of Starter-Generators can result in rapid brush wear and even hang-ups. When inspecting brushes, many operators will slide the brush cover off the back of the generator causing the brush leads to be misplaced.

Sliding the cover forward again, further misplaces the brush leads. If the generator is mounted on the engine while the inspection is being made, some brush boxes cannot be seen, making brush lead positioning impossible.

Removing brushes from brush boxes can cause the brush position in the box and the relationship to the commutator of the brush to be disturbed. The disturbed brush may wear faster than normal.

One brush inspection between overhauls of the SAI generator is all that may be required of the SAI brushes.

In essence, this procedure allows the operator to determine his time between brush changes and may help fix the overhaul periods to be at the same time brushes must be replaced.

At 300 hours, remove the generator for brush inspection. Remove the shortest brush only to measure the remaining brush life. Do not remove more than one brush, as brush seating will be affected. Your brush inspection time will be obtained by measuring three different generators and using the shortest brush length, as the basis for determining your fleet wide brush life. Filling in the attached form, will show you how to determine remaining brush life. Using this procedure will aid you in determining your Mean Time Between Overhauls (MTBO). The generator must be overhauled at 1,000 hours, at which time the bearing must be replaced.

The SAI 200SGL ampere Starter-Generators can usually operate for a minimum of 400-800 hours without brush change. At 1,000 hours time, the generator must be removed for overhaul and bearings changed, unless the SAI overhaul manual or aircraft manufacturer states the bearings can be operated in excess of 1,000 hours.

Please note, this procedure can only be accomplished with a new generator or a generator that has been overhauled in accordance with SAI Overhaul Procedures and the commutator has been turned (resurfaced) in a lathe.



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## GENERATOR SERIES 200SGL SAMPLE CALCULATION PROCEDURE BRUSH P/N 200SGL1009

At 300 hours, remove the generator for brush inspection. Remove the shortest brush only. Do not remove more than one brush as brush seating will be affected.

### SAMPLE CALCULATION

Date: 16 Dec 1998

Generator P/N: 200SGL117Q

Serial No.: 1200

Calculate brush life left as per example below:

Maximum wear length of a new 150SG1009-5 Brush (1) .625

Brush wear left (as measured from shortest brush) (2) .310

**TOTAL BRUSH WEAR** (3) .315

**Hours brush has operated:** (4) 300

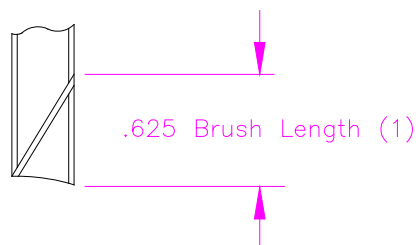
(3)  $\frac{.315}{\text{Total Brush Wear (from \#3 above)}}$   $\div$  (4)  $\frac{300}{\text{Hours Brush Operated (from \#4 above)}}$  = (5) .00105 Rate of brush wear per hour

(2)  $\frac{.310}{\text{Brush Wear Left (from Item \#2 above)}}$   $\div$  (5)  $\frac{.00105}{\text{Rate of Brush Wear per Hour (from Item \#5 above)}}$  = (6) 295 Hours of brush left before brushes must be replaced

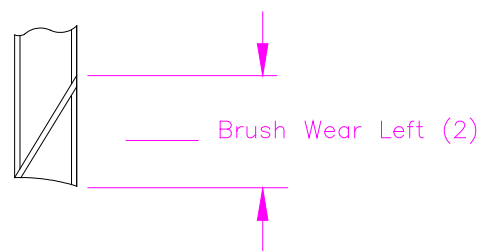
**Generator Operating Hours:**  $\frac{295}{\text{Hours Left (from Item \#6)}}$  +  $\frac{300}{\text{Total Hours on Generator Thus Far (from Item \#4)}}$  =  $\frac{595}{\text{Total Hours Generator Can Operate Before Brush Change}}$

If 150 hours or more of brush life is left, reinstall the brush and operate the generator for the remaining hours of brush wear left, as calculated above or for a maximum of 1,000 hours. At that time, return the unit to an Authorized SAI Repair Station for overhaul.

### New Brush



### Shortest Brush from Generator



Remove the generator the second time after the additional operating hours established by your calculations has been reached. Inspect the brushes. If all are below the maximum brush wear mark, the generator MTBO has been established. If you desire, two or three more generators can be tested to establish an average brush life.



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## GENERATOR SERIES 200SGL SAMPLE CALCULATION PROCEDURE BRUSH P/N 200SGL1009

At 300 hours, remove the generator for brush inspection. Remove the shortest brush only. Do not remove more than one brush as brush seating will be affected.

Date: \_\_\_\_\_

Generator P/N: \_\_\_\_\_

Serial No.: \_\_\_\_\_

Calculate brush life left as per example below:

Maximum wear length of a new 150SG1009-5 Brush (1) .625

Brush wear left (as measured from shortest brush) (2) \_\_\_\_\_

**TOTAL BRUSH WEAR** (3) \_\_\_\_\_

**Hours brush has operated:** (4) \_\_\_\_\_

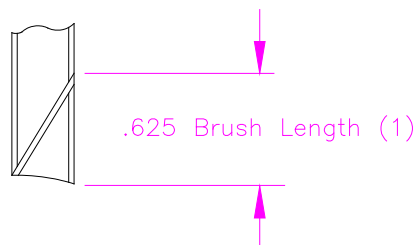
(3)  $\frac{\text{Total Brush Wear (from \#3 above)}}{\text{Hours Brush Operated (from \#4 above)}} =$  (5) \_\_\_\_\_ Rate of brush wear per hour

(2)  $\frac{\text{Brush Wear Left (from Item \#2 above)}}{\text{Rate of Brush Wear per Hour (from Item \#5 above)}} =$  (6) \_\_\_\_\_ Hours of brush left before brushes must be replaced

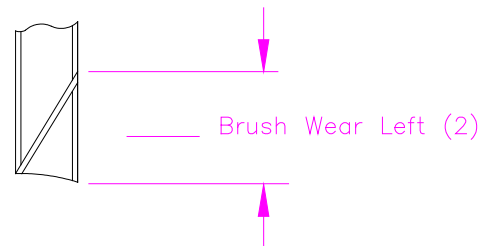
**Generator Operating Hours:** \_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_  
Hours Left (from Item #6) Total Hours on Generator Thus Far (from Item #4) Total Hours Generator Can Operate Before Brush Change

If 150 hours or more of brush life is left, reinstall the brush and operate the generator for the remaining hours of brush wear left, as calculated above or for a maximum of 1,000 hours. At that time, return the unit to an Authorized SAI Repair Station for overhaul.

### New Brush



### Shortest Brush from Generator



Remove the generator the second time after the additional operating hours established by your calculations has been reached. Inspect the brushes. If all are below the maximum brush wear mark, the generator MTBO has been established. If you desire, two or three more generators can be tested to establish an average brush life.



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## SERVICE LETTER #134

**ATTENTION: OPERATORS OF SKURKA AEROSPACE INC. (SAI)  
STARTER-GENERATORS**

**SUBJECT: DRIVE SHAFT ALIGNMENT**

The drive shaft must stay aligned with and concentric to the armature.

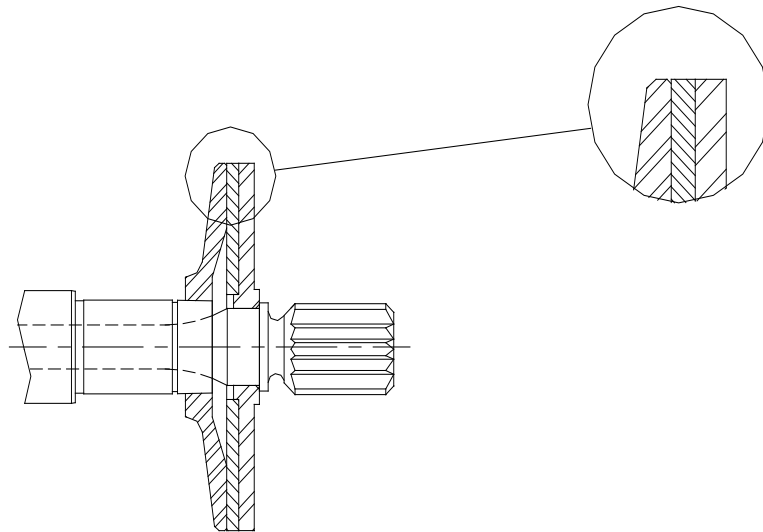
The drive shaft may be pushed off center and out of position due to mishandling during shipping or installation. If the starter-generator is allowed to be installed with the drive shaft out of position, excessive vibration and damage may develop during operation.

Therefore, before installation of the starter-generator on an engine, carefully inspect the drive shaft and dampner plate assembly. See enclosed sketch. If the drive shaft appears to be out of position, lightly tap on the drive shaft spline, using a plastic mallet to move it back into full concentric position.

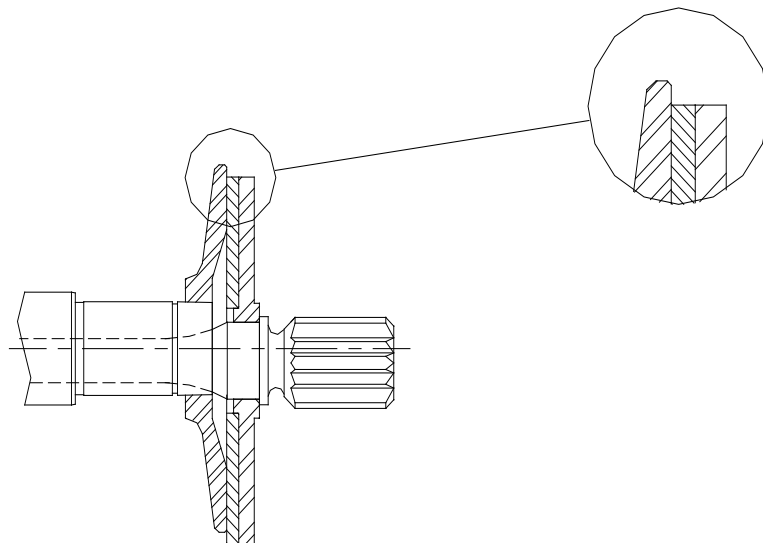
The starter-generator should be installed or removed in accordance with procedures as outlined in Service Bulletin SB150SG114.



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DRIVE SHAFT CONCENTRIC WITH ARMATURE SHAFT



DRIVE SHAFT OUT OF POSITION



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---

**SERVICE LETTER #173**

**ATTENTION: ALL HOLDERS OF SAI OVERHAUL MANUALS**  
**TM105A 200SGL SERIES STARTER-GENERATOR**

**SUBJECT: ACCEPTANCE TEST DATA SHEET**

**REFERENCE: SECTION III TEST PROCEDURE**

- A. The enclosed Data Sheet format may be used to record test results of Section III – Test Procedure.
- B. Please note that under Para. 3-19, a 3.187 inch thick Flywheel may be used in lieu of the 0.836 inch thick Flywheel.
- C. Please note that under Para. 3-21 Commutator Runout, the TIR should not exceed 0.0008 inch.



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Ref: Overhaul Manual TM105A

**ACCEPTANCE TEST DATA SHEET 200SGL SERIES**

| S/G MODEL NO.<br>200SGL _____ |                                                                                                    | SERIAL<br>NO. _____                                                                                                      | SALES/WORK ORDER NO.<br>_____                             | TESTED BY:<br>_____ | DATE: _____<br>TEST STAND<br>NO. _____ |     |
|-------------------------------|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|---------------------|----------------------------------------|-----|
| MOD/REV _____                 |                                                                                                    |                                                                                                                          |                                                           |                     |                                        |     |
| TEST<br>PARA.                 | INSPECTION/TEST                                                                                    | REQUISITES                                                                                                               | MEASUREMENT                                               |                     | ACC                                    | REJ |
| 3-10                          | Brush Seating                                                                                      | 100% Seating all Brushes                                                                                                 | X                                                         | X                   |                                        |     |
| 3-13                          | Maximum Speed for<br>Regulation 13,000 + 0 / -100<br>RPM No Load, 28.5 ± 0.1<br>VDC                | Ammeter readout (A+) 0.81 amps min.                                                                                      |                                                           | amps                |                                        |     |
| 3-14a.                        | Minimum Speed for<br>Regulation, 7,050 +100 / - 0<br>RPM, 28.5 ± 0.1 VDC, 200 ± 5<br>Amp           | Field Current (A+ within 10.0 amps)                                                                                      |                                                           | amps                |                                        |     |
| 3-<br>14b.,c.                 | Continuous Operating Speed<br>and Equalizing Voltage<br>12,100 ±100 RPM<br>200 ±5 Amp, 30 ±0.1 VDC | Stabilized Temp. (gen. yoke)                                                                                             |                                                           | °F                  |                                        |     |
|                               |                                                                                                    | D-E Voltage                                                                                                              |                                                           | vdc                 |                                        |     |
|                               |                                                                                                    | Air In Temp.                                                                                                             |                                                           | °F                  |                                        |     |
| 3-15                          | Commutation<br>30 ± 0.1 VDC<br>and<br>Compounding                                                  | 7050 +100 / - 0 RPM,<br>0, 100, 200 (± 5) Amp                                                                            | Not to exceed pinpoints, Field Current<br>rises with Load | X                   | X                                      |     |
|                               |                                                                                                    | 10,000 ±100 RPM,<br>0, 100, 200 (± 5) Amp                                                                                | Not to exceed pinpoints, Field Current<br>rises with Load | X                   | X                                      |     |
|                               |                                                                                                    | 12,000 ± 100 RPM,<br>0, 100, 200 (± 5) Amp                                                                               | Not to exceed pinpoints, Field Current<br>rises with Load | X                   | X                                      |     |
| *Section<br>VI                | *Speed Pick-Up<br>6,000 ± 100 rpm                                                                  | Output 2.5 volts peak to peak minimum                                                                                    |                                                           | vac                 |                                        |     |
|                               |                                                                                                    | Wave form shape                                                                                                          | X                                                         | X                   |                                        |     |
| 3-16                          | Overspeed 5 min 14,000<br>± 100 RPM                                                                | No Sign of Failure                                                                                                       | X                                                         | X                   |                                        |     |
|                               | Post Overspeed 12,000 ± 100<br>RPM, 30 ±0.1 VDC, 200 ±5<br>Amps                                    | No Sign of Failure                                                                                                       | X                                                         | X                   |                                        |     |
| 3-17                          | Dielectric Strength<br>250 ± 10 VAC, RMS, 1.0 sec                                                  | No Sign Of Breakdown                                                                                                     | X                                                         | X                   |                                        |     |
| 3-19                          | Accelerating Run (cranking)<br>28.0 ± 0.1 VDC Supply<br>Voltage                                    | Peak In Rush Current (1000 amps max)                                                                                     |                                                           | amps                |                                        |     |
|                               |                                                                                                    | 0-6500 ± 100 RPM within 36 seconds for<br>series start generators                                                        |                                                           | sec                 |                                        |     |
|                               |                                                                                                    | 0- 6500 ± 100 RPM within 50 seconds for<br>series start generators, with optional<br>3.187 inch thick Flywheel           |                                                           | sec                 |                                        |     |
|                               |                                                                                                    | 0-3800 ±100 RPM within 30 seconds for<br>shunt start generators (Section VI)                                             |                                                           | sec                 |                                        |     |
|                               |                                                                                                    | 0-3800 ±100 RPM within 40 seconds for<br>shunt start generators, with optional<br>3.187 inch thick Flywheel (Section VI) |                                                           | sec                 |                                        |     |
| 3-21                          | Commutator Runout                                                                                  | Bar-to-Bar (not to exceed 0.0002 inch)                                                                                   |                                                           | inch                |                                        |     |
|                               |                                                                                                    | TIR (not to exceed 0.0008 inch)                                                                                          |                                                           | inch                |                                        |     |
| 3-22                          | Radial Vibration                                                                                   | Within Limits (.001 inch total max.)                                                                                     |                                                           | inch                |                                        |     |

\*When Applicable

INSPECTED BY \_\_\_\_\_ DATE \_\_\_\_\_ QC STAMP \_\_\_\_\_



Skurka Aerospace Inc.  
4600 Calle Bolero, P. O. Box 2869  
Camarillo, CA 93011

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## SERVICE LETTER #192

ATTENTION: ALL HOLDERS OF OVERHAUL MANUAL TM105A:  
200SGL SERIES STARTER-GENERATOR

SUBJECT: STARTER-GENERATOR MODELS 200SGL132Q-3,  
UPDATING LABEL TO ADD “-XL2”

### PURPOSE:

This procedure is intended to properly mark the 200SGL132Q-3 Starter-Generators as having the “XL2” Long life configuration.

### REASON:

Some units may be missing the proper marking on the nameplate. These instructions will provide the proper identification of 200SGL132Q-3, Starter-Generators.

### APPROVAL:

This Service Bulletin has the approval of Skurka Aerospace Inc.

### SERIAL NUMBERS AFFECTED:

The following starter-generator serial numbers are affected by these instructions:

|      |      |      |
|------|------|------|
| 5795 | 6327 | 6276 |
| 6280 | 6066 | 6407 |
| 5823 | 6328 | 6277 |
| 6324 | 6103 | 6408 |
| 5824 | 6329 | 6278 |
| 6325 | 6104 | 6409 |
| 5825 | 6331 | 6279 |
| 6326 | 6193 | 6421 |



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PROCEDURE:

1. Metal stamp the suffix "-XL2" immediately after the serial number in 0.08 inch high characters. See example below:

|      |          |
|------|----------|
| Was  | Becomes  |
| 6066 | 6066-XL2 |

2. Carefully fill the impression with black lacquer and allow to dry.
3. Re-install label onto starter-generator.



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## TECHNICAL DOCUMENTATION SUGGESTION FORM

Suggested Additions(s), deletions(s), or corrections(s):  
*Please attach a copy of each affected page*

Submittal Date: \_\_\_\_\_

Company/Organization

Name/Title

Full Address:

Telephone:  
Fax:

Please send completed Form to the attention of "Sales—  
Product Line Manager", at:

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