

SERVICE INFORMATION NO. SI 40-052/1

SUPERSEDES SERVICE INFORMATION SI 40-052

NOTE: SI's are used **only**:
1) To distribute information from DAI to our customers.
2) To distribute applicable information / documents from our suppliers to our customers with additional information.
Typically there is no revision service for SI's. Each new information or change of that will be send along with a new SI.

I. TECHNICAL DETAILS

1.1 Airplanes affected:

DA 40, S/N 40.006 up to and inclusive 40.824, aircraft and
DA 40 F, S/N 40.FC001 up to and inclusive 40.FC027, aircraft
equipped with GFC 700 (GSM 85 Servo Gearbox).

1.4 Information:

GARMIN has issued the Service Bulletin No. 0713 Rev. D concerning the inspection of the GSM 85 servo gearbox for the presence of FOD (Foreign Object Debris) that may be inside the housing.

For further information refer to GARMIN Service Bulletin No. 0713 Rev. D.

II. OTHERS

The GARMIN Installation Bulletin No. 0713 Rev. D is attached to this SI.

In case of doubt contact GARMIN.



SERVICE BULLETIN

NO.: 0713 Revision D

TO: All Garmin Aviation Service Centers and Aircraft OEM Service Centers

DATE: 13 June 2007

SUBJECT: GSM 85 Inspection Procedure

REVISION D: Revision D corrects LRU Part Numbers listed in Step 3.4, Step 4.6, Step 5.4, and in Tables 2, 4, and 5. Previous revisions of Service Bulletin 0713 are superseded by this bulletin.

PURPOSE

All GSM 85 servo gearboxes (also referred to as servo mounts) must be inspected per the instructions in this bulletin.

DESCRIPTION

All GSM 85 servo gearboxes must be inspected for the presence of FOD (Foreign Object Debris) that may be inside the housing.

APPROVAL

LRU	LRU Part Number	TSO/ETSO
GSM 85	011-00894-()	TSO-C9c, ETSO-C9c

Table 1

AFMS AND PILOT'S GUIDE CONSIDERATIONS

There are no Pilot's Guide or Cockpit Reference Guide changes required.

REFERENCES

GSA 8X/GSM 85(A) Installation Manual, 190-00303-72
OEM Aircraft Maintenance Manual
Garmin Service Bulletin 0607

PRODUCT AFFECTED

This bulletin is applicable to all GFC 700-equipped aircraft (excluding Cessna Mustang). These aircraft include up to four GSM 85s.

GSM 85s with a Mod Level marked on the serial tag as listed in Table 2 have already been inspected for FOD, and are therefore not affected by this bulletin.

LRU	LRU Part Number	Mod Level
GSM 85	011-00894-00 or -10	3
GSM 85	011-00894-02 011-00894-04 011-00894-06 011-00894-07 011-00894-08 011-00894-09 011-00894-11 011-00894-14	1

Table 2

NOTE

This bulletin is not applicable to GSM 85A (011-01436-XX) servo gearboxes.

COMPLIANCE

Mandatory: This service bulletin must be incorporated in all GFC 700-equipped aircraft (excluding Cessna Mustang) within the time specified below.

Which ever of the following occurs first:

- o The next maintenance activity that involves removal or inspection of the GSM 85 servo gearboxes
- o 100 hours of time in-service from the date of this bulletin
- o 3 months from the date of this bulletin

Garmin will request an Airworthiness Directive (AD) for this issue. If/when an AD is issued, Garmin anticipates that it will refer to this service bulletin.

WARRANTY INFORMATION

This modification is warranty reimbursable for the hours listed in the Manpower section. When completing the Garmin warranty claim, be sure to include the following information to ensure proper reimbursement.

- o Aircraft Serial Number
- o Aircraft Registration Number
- o Part Number of each GSM 85
- o Serial Number of each GSM 85
- o Clearly indicate that this Service Bulletin has been complied with

MANPOWER

Aircraft	Axis	Manpower Hours Allowed per Procedure(s)		
		A	B	C
Columbia 350	Pitch	2.0	3.0	0.3
	Roll	1.5	2.5	0.3
Columbia 400	Pitch	3.0	4.0	0.3
	Roll	1.5	2.5	0.3
Diamond DA40	Pitch	1.0	3.0	0.3
	Roll/PT	2.0	4.0	0.3
Mooney M20M/R	Pitch/Roll/PT	1.5	2.5	0.3
Cessna 182 (no air conditioning)	Roll	0.7	2.1	0.3
	Pitch	0.6	1.5	0.3
	Pitch Trim	0.6	1.5	0.3
Cessna 182 (with air conditioning)	Roll	0.7	2.1	0.3
	Pitch	1.1	2.0	0.3
	Pitch Trim	1.1	2.0	0.3
Cessna 206 (no air conditioning)	Roll	0.9	2.8	0.3
	Pitch	0.9	2.2	0.3
	Pitch Trim	0.9	2.2	0.3
Cessna 206 (with air conditioning)	Roll	0.9	2.8	0.3
	Pitch	2.9	4.2	0.3
	Pitch Trim	0.9	2.2	0.3
Hawker Beechcraft G36/58	Pitch/Roll/PT	2.0	3.0	0.3
	Yaw	1.5	2.5	0.3

Table 3

Column A – These are the allowable hours for the Modification Instructions in Section 4 Borescope Inspection where completing these steps did not necessitate the removal of a GSM 85 from the aircraft. These hours may not be combined with the hours in Columns B or C.

Column B - These are the allowable hours for the Modification Instructions in Section 4 Borescope Inspection or 5 FOD Inspection by GSM Removal (not both) where any of these steps necessitated removal of a GSM 85.

Column C - These are the allowable hours for setting the slip-clutch breakaway torque value as per Section 6 Reinstallation, which is necessary if a GSM 85 is replaced. If applicable, these hours may be additive to the hours in Column B, but not to the hours in Column A.

IDENTIFICATION PROCEDURE

Check the aircraft's maintenance records to determine if the inspection procedure in this bulletin has already been performed or is not applicable. If not previously accomplished and is determined to be applicable, proceed with the inspection steps listed in this bulletin.

MODIFICATION INSTRUCTIONS

1 General Instructions

Any GSM 85s returned from Garmin will require a Garmin Slip-Clutch Fixture, P/N T10-00110-01 to set the slip-clutch breakaway torque before it can be installed in the aircraft. Ensure the fixture is available before returning GSM 85s to Garmin. In some cases, a preset GSM 85 may be available from the aircraft manufacturer, contact them for availability.

2 Pre-Inspection Procedure

Perform all of the following instructions for all affected GSM 85 servo gearboxes in the aircraft.

- 2.1 Move the flight controls full travel in every axis including the pitch trim, to verify smooth operation of all GFC 700 components.
- 2.2 If roughness is felt in any axis, determine if the roughness is caused by an airframe component other than a GSM 85 servo gearbox. If the roughness in any axis is caused by an airframe component other than a GSM 85, then correct the condition. If the roughness in any axis is caused by a GSM 85 servo gearbox, then remove and return suspect GSM 85 servo gearbox to Garmin for exchange. After receiving the replacement GSM 85 from Garmin, proceed to Section 6 Reinstallation.
- 2.3 When smooth operation of every axis with a flight control servo has been verified, proceed to one of the following sections as applicable:
 - o Section 3 Extrusion Surface Inspection for aircraft at an OEM facility
 - o Section 4 Borescope Inspection for inspection without removal of GSM 85
 - o Section 5 FOD Inspection by GSM Removal for inspection by removal of GSM 85

3 Extrusion Surface Inspection

NOTE

The Extrusion Surface Inspection is for OEM Factories only.

The potential for FOD resulted from a tumbling process that is selectively used to deburr the aluminum extrusion (housing) of the GSM 85. Since not all extrusions were deburred using the tumbling process, determining which extrusions were tumbled can also identify the candidate GSM 85s that require inspection. Only extrusions that were tumbled have the possibility of FOD in the extrusion. Garmin will provide samples (work-aids) of tumbled and non-tumbled extrusions to OEM's for this inspection process. If a Garmin provided work-aid is not available, proceed to Section 4 Borescope Inspection or Section 5 FOD Inspection by GSM Removal as applicable.

Perform all of the following instructions for all affected GSM 85 servo gearboxes in the aircraft.

- 3.1 Inspect any visible side of the GSM 85 extrusion per the Garmin supplied work-aids. Only one side of the extrusion must be visible for this inspection.
- 3.2 If the extrusion surface matches the tumbled work-aid (a dull surface, and without the adjacent parallel vertical lines), or if no conclusive determination can be made as to a tumbled or non-tumbled status of the extrusion, further inspection is necessary, proceed to Section 4 Borescope Inspection or Section 5 FOD Inspection by GSM Removal as applicable.
- 3.3 If the extrusion surface matches the non-tumbled work-aid, (a shiny surface, and the presence of adjacent parallel vertical lines), no possibility of FOD exists, and no further inspection is necessary, proceed to Step 3.4.

- 3.4 For GSM 85s part number 011-00894-00 or 011-00894-10, mark the MOD 3 circle (on the serial tag) with an indelible marker indicating compliance with this bulletin. For GSM 85s part number 011-00894-XX (where -XX is -02, -04, -06, -07, -08, -09, -11, or -14), mark the MOD 1 circle (on the serial tag) with an indelible marker indicating compliance with this bulletin.

NOTE

If the serial tag is not accessible (for marking mod status) on an installed GSM 85 servo gearbox, a Supplemental Mod Status Tag (Figure 3-1), P/N 161-01726-00 (or equivalent that provides all of the same information) can be marked Mod 1 or Mod 3 per Step 3.4 and placed on an accessible surface of the GSM 85.

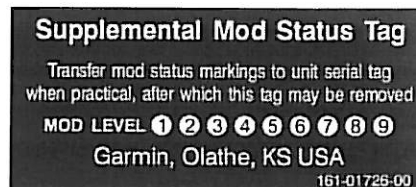


Figure 3-1

The serial tag shall be marked with the mod status from the Supplemental Mod Status Tag during the next regular service that allows access to the serial tag. The supplemental tag should be removed from the GSM 85.

- 3.5 Proceed to Step 6.6 of this bulletin.

4 **Borescope Inspection (optional process that may be performed instead of Section 5 FOD Inspection by GSM Removal)**

This method of inspection requires the availability of a flexible borescope. If inspection cannot be performed using a borescope, proceed to Section 5 FOD Inspection by GSM Removal.

Perform all of the following instructions for all affected GSM 85 servo gearboxes in the aircraft.

- 4.1 Remove the GSA 8X servo from the GSM 85 per the OEM Aircraft Maintenance Manual.
- 4.2 Insert the borescope into the hole on the bottom side of the GSM 85 where the actuator gear of the GSA 8X servo inserts.
- 4.3 Maneuver the borescope to view all potential areas where foreign objects (FOD) may be present, particularly in the corners of the extrusion (Figure 4-1). Also look closely at the gears for the presence of FOD, rotate the gears to view all potential areas for FOD. FOD may be present anywhere inside of the extrusion, not only where shown in Figure 4-1.

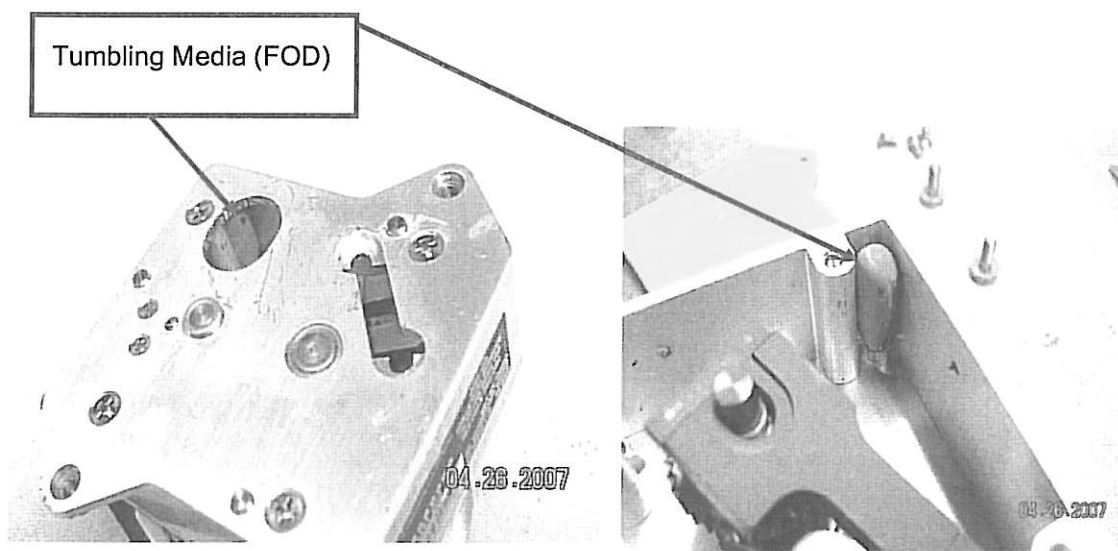


Figure 4-1

- 4.4 If FOD is present, remove the GSM 85 per the OEM Aircraft Maintenance Manual and return the GSM 85 servo gearbox to Garmin for exchange. After receiving the replacement GSM 85 from Garmin, proceed to Section 6 Reinstallation.

- 4.5 If the borescope inspection produces no conclusive determination regarding the absence of FOD, proceed to Section 5 FOD Inspection by GSM Removal.
- 4.6 If it is conclusively determined that no FOD is present:
- o For GSM 85s part number 011-00894-00 or 011-00894-10 only, mark the MOD 3 circle (on the serial tag) with an indelible marker indicating compliance with this bulletin.
 - o For GSM 85s part number 011-00894-XX (where -XX is -02, -04, -06, -07, -08, -09, -11, or -14), mark the MOD 1 circle (on the serial tag) with an indelible marker indicating compliance with this bulletin.

NOTE

If the serial tag is not accessible (for marking mod status) on an installed GSM 85, a Supplemental Mod Status Tag (Figure 4-2), P/N 161-01726-00 (or equivalent that provides all of the same information) can be marked Mod 1 or Mod 3 per Step 4.7 and placed on an accessible surface of the GSM 85.

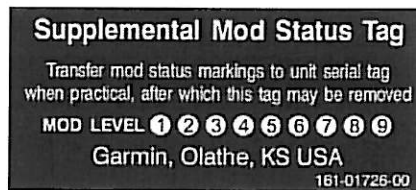


Figure 4-2

The serial tag shall be marked with the mod status from the Supplemental Mod Status Tag during the next regular service that allows access to the serial tag. The supplemental tag should be removed from the GSM 85 servo gearbox.

- 4.7 Proceed to Step 6.3 of this bulletin.

5 FOD Inspection by GSM Removal

This inspection is performed if Section 3 Extrusion Surface Inspection and/or Section 4 Borescope Inspection were either not performed, or were performed and did not conclusively eliminate the possibility of the presence of FOD in the GSM 85 extrusion.

NOTE

While the GSM 85 servo gearbox is removed from the aircraft, Garmin recommends compliance with Service Bulletin 0607.

Perform all of the following instructions for all affected GSM 85 servo gearboxes in the aircraft.

- 5.1 Remove the GSM 85 from the aircraft per the OEM Aircraft Maintenance Manual.
- 5.2 As each GSM 85 is removed, make sure it is appropriately tagged to indicate the axis (pitch, roll, yaw, or pitch trim) from which it was removed in the aircraft. A Slip Clutch Setting Label, P/N 161-01514-00 (or equivalent that provides all of the same information) may be used for this purpose (Figure 5-1). This information is recorded in aircraft maintenance records for reference when the parts are reinstalled.

Date	Torque	Axis	Aircraft	
				label p/n 161-01514-00

Figure 5-1

- 5.3 For GSM 85 servo gearboxes part numbered 011-00894-00 and 011-00894-10 only, check the serial tag for a MOD 2 marking. If MOD 2 is marked on these GSM 85s, proceed to Step 5.5. If MOD 2 is not marked on the serial tag, return the GSM 85 to Garmin for exchange. After receiving the replacement GSM 85 from Garmin, proceed to Section 6 Reinstallation.
- 5.4 For all GSM 85s part numbered 011-00894-XX, where XX is -02, -04, -06, -07, -08, -09, -11, or -14, proceed to Step 5.5.
- 5.5 Use a thin (.098" to 0.130" dia.), stiff tool (such as a small screwdriver) that can go into the mounting holes in each corner to verify it can be inserted at least 1.35". This is to make sure there is not any FOD lodged in the internal corners of the extrusion. If the tool cannot be fully and smoothly inserted and removed from all four mounting holes, it is assumed that FOD is present in the extrusion. If tool cannot be fully inserted, return the GSM 85 servo gearbox to Garmin for exchange. After receiving the replacement GSM 85 from Garmin, proceed to Section 6 Reinstallation. If no FOD is found proceed to Step 5.6.

- 5.6 Shake the unit vigorously along three different axes to listen for loose FOD inside the unit. When shaking the GSM 85, hold the capstan securely so that it does not rattle and is not misinterpreted as FOD. Any rattling from within the gearbox is assumed to be FOD. If rattling occurs, return the GSM 85 to Garmin for exchange. After receiving the replacement GSM 85 from Garmin, proceed to Section 6 Reinstallation. If no FOD is found proceed to Step 5.7.
- 5.7 Rotate the capstan at least two full turns in each direction to check for rough operation or obstructions in the gear-train. Any roughness in the rotation of the capstan is assumed to be caused by the presence of FOD. If there is any roughness in the rotation of the capstan, return the GSM 85 to Garmin for exchange. After receiving the replacement GSM 85 from Garmin, proceed to Section 6 Reinstallation. If no FOD is found and the gearbox is operating smoothly, proceed to Step 5.8
- 5.8 If the GSM 85 complies with the preceding inspection steps 5.1 through 5.7, then mark the MOD status (on the serial tag) with an indelible marker per Table 4.

LRU	LRU Part Number	Mod Level
GSM 85	011-00894-00 or -10	3
GSM 85	011-00894-02 011-00894-04 011-00894-06 011-00894-07 011-00894-08 011-00894-09 011-00894-11 011-00894-14	1

Table 4

- 5.9 Proceed to Step 6.3 of this bulletin.

6 Reinstallation

Perform all of the following instructions for all affected GSM 85 servo gearboxes in the aircraft.

- 6.1 Verify that the Mod Status on the serial tag of the GSM 85 is marked correctly per Table 5.

LRU	LRU Part Number	Mod Level
GSM 85	011-00894-00 or -10	3
GSM 85	011-00894-02 011-00894-04 011-00894-06 011-00894-07 011-00894-08 011-00894-09 011-00894-11 011-00894-14	1

Table 5

- 6.2 Set the slip-clutch breakaway torque per the OEM Aircraft Maintenance Manual. This procedure requires a Garmin Slip-Clutch Fixture, P/N T10-00110-01. If an OEM has provided a GSM 85 with the torque value already set, this step is not required.
- 6.3 The gear on the GSA 8X servo that mates to the GSM 85, should be thoroughly cleaned, inspected for any damage, and re-lubed with grease that conforms to MIL-G-21164D. If any gear damage is found, the GSA 8X servo must be replaced.
- 6.4 Reinstall the GSM 85 (and any GSA 8X servos removed in Section 4) in its original location in the aircraft per the OEM Aircraft Maintenance Manual. During reinstallation, verify the servo motor is aligned with the GSM 85 servo gearbox and both are fully seated together with less than 1/32" gap before tightening the mounting bolts. **Do not use the mounting bolts to draw the assemblies together if there is a larger gap, damage may result to the GSM 85 servo gearbox, requiring replacement.**
- 6.5 Perform the post installation checkout described in the OEM Aircraft Maintenance Manual before returning the aircraft to service.
- 6.6 Make appropriate entry in the aircraft's maintenance records, noting that this Service Bulletin has been complied with and the basis for returning the aircraft to service. Note the serial number and new Mod Level that was marked on each GSM 85 as it was reinstalled.

MATERIAL INFORMATION

Slip Clutch Setting Label, P/N 161-01514-00

Supplemental Mod Status Tag, P/N 161-01726-00

Garmin Slip-Clutch Fixture, P/N T10-00110-01

ADDITIONAL INFORMATION

NA