GFC 700 AUTOPILOT - ADJUSTMENT/TEST

1. General

A. This section gives the tests and checks necessary to keep the Garmin GFC 700 Autopilot System, GMC 710 AFCS Mode Controller and associated switches in a serviceable condition. For a general overview of the GFC 700 Autopilot System refer to GFC 700 Autopilot- Description and Operation.

2. Garmin GFC 700 Autopilot Operational Check

A. Tools and Equipment

NOTE: For the supplier publication part number and manufacturer data, refer to the Introduction - Supplier Publication List.

(1) Tools and Equipment

- None.

(2) Special Consumables

- None.

(3) Reference Material

- GFC 700 Autopilot- Description and Operation
- Chapter 34, Garmin G1000 Integrated Avionics System - Adjustment/Test.

B. Prepare the Airplane

(1) Make sure that the switches that follow are in the OFF position:

(a) BATTERY switch.

(b) EXTERNAL POWER switch.

(c) AVIONICS 1 and 2 switches.

(2) Connect external electrical power to the airplane.

(3) Make sure that all the circuit breakers on the Avionics circuit breaker panel are engaged.

(4) Put the switches that follow in the positions given:

(a) External POWER switch to the BUS position.

(b) BATTERY switch to the ON position.

(c) Avionics 1 and 2 switches to the ON position.

(5) On the GMA 1347/1360D Audio Panel SPKR button is pushed in the on position.

(6) When power is applied to the airplane the AFCS starts a preflight test shown by an AFCS message (white) replacing a red AFCS message in the upper part of the primary flight display.

(7) When the test is complete and good:

(a) The message is removed from the PFD display.

(b) A two-tone aural message is repeated three times that the test was successful.

(8) After the Garmin G1000 system is fully initiated refer to Garmin G1000 Integrated Avionics System - Adjustment/Test and do the steps that follow:

(a) Do the Architecture Verification check and make sure all systems are serviceable.

(b) Make sure that the correct software and configuration has been installed.

3. GMC 710 AFCS Controller and Related Switches Operation Check

A. Autopilot Disconnect Switch Operational Check.

(1) On the AFCS controller, push the AP button to engage the autopilot.

(a) Make sure that there is a green AP and YD on each of the two PFD's.

(2) On the left control wheel, push the AP DISC switch.

(a) Make sure that the intensity of the green AP and YD (green) change to flashing (amber) AP and YD , that indicates a manual disengagement.

(b) Make sure that the autopilot disconnect tone is heard.

(3) On the AFCS controller, push the AP button to engage the autopilot again.
(4) On the right control wheel, push the AP DISC switch.
(a) Make sure that the intensity of the AP (green) and YD (green) change to flashing (amber) AP and YD, that indicates a manual disengagement.
(b) Make sure that the autopilot disconnect tone is heard.

B. Go Around (GA) Switch Operational Check
(1) On the AFCS controller, push the AP button to engage the autopilot again.
(2) Momentarily push the GA switch located near the throttle and make sure that:
(a) The autopilot disengages.
(b) Take Off mode is annunciated, on each of the two PFD's.
(c) There are green TO's on either side of an amber flashing AP that indicates the autopilot is no longer engaged.
(d) The Flight Director command bars indicate a 5 to 10 degree pitch up command.
(3) Push the FD button to disengage Flight Director and clear Take Off mode.

C. Control Wheel Steering (CWS) Operational Check.
(1) On the AFCS controller, push the AP button to engage the autopilot.
(2) On the left control wheel, push and hold the CWS button and make sure that:
(a) The auto pilot disconnects.
(b) The autopilot status display, a CWS (white) is shown.
(c) YD stays engaged.
(3) Release the pilot's CWS switch and make sure that:
(a) The CWS is replaced by an AP (green).
(4) On the right control wheel, push and hold the CWS button and make sure that:
(a) The auto pilot disconnects.
(b) The autopilot status display, a CWS (white) is shown.
(c) YD stays engaged.
(5) Release the copilot's CWS switch and make sure that:
(a) The CWS is replaced by an AP (green).

D. Manual Electric Trim (MET) Switch Operational Check.
(1) When only the left (arm) of the pilot's MET switch is moved in the UP direction. make sure that:
(a) The intensity of the green AP (green) change to flashing (amber) AP, that indicates a manual disengagement.
(b) The autopilot disconnect tone is heard.
(2) On the AFCS controller, push the AP button to engage the autopilot.
(3) When only the left (arm) of the pilot's MET switch is moved in the DOWN direction. make sure that:
(a) The intensity of the green AP and YD (green) change to flashing (amber) AP and YD, that indicates a manual disengagement.
(b) The autopilot disconnect tone is heard.
(4) With the AP disengaged, make sure that the trim system operates as follows:
(a) Push both sides on the Pilot's MET switch in the DOWN direction and make sure the trim system operates in the down direction.
(b) Push both sides on the Pilot's MET switch in the UP direction and make sure the trim system operates in the UP direction.

4. Garmin AFCS Servos Operational Checks

A. Roll Servo Operational Check (Refer to Figure 601).
(1) Make sure that the cable tension is 12 pounds, +2.0 or -2.0 pounds at 70°F (53 N, +8.9 or -8.9 N at 21°C).
(2) On the AFCS controller, push the AP button to engage the autopilot.

(3) Synchronize the heading bug to the current heading by pushing the HDG PUSH SYNC knob on the autopilot controller.

(4) Push the HDG button on the AFCS controller to select heading mode.

(a) Make sure HDG (green) is shown.

(5) Turn the HDG knob on the autopilot controller approximately 10 degrees counterclockwise.

(a) Make sure that the control wheel turns left until it hits the control wheel stops.

(6) Synchronize the heading bug to the current heading by pushing the HDG PUSH SYNC knob on the autopilot controller.

(a) Make sure that the control wheel stops turning.

(7) Turn the HDG knob on the autopilot controller approximately 10 degrees clockwise.

(a) Make sure that the control wheel turns right until it hits the control wheel stops.

(8) Synchronize the heading bug to the current heading by pushing the HDG PUSH SYNC knob on the autopilot controller.

(9) Push and hold the control wheel CWS button.

(10) Put the control wheel in the center position.

(11) Release the CWS button.

(a) Make sure that the control wheel does not move.

B. Pitch Servo Operational Test (Refer to Figure 601).

NOTE: Make sure the pitch trim system is centered for this test by manually (or electrically using the trim switch) manipulating the trim wheel until the pointer next to the trim wheel is centered. The pitch trim clutch will slip if it is commanded beyond the trim tab stops. The trim wheel will not turn in this condition.

(1) Make sure that the cable tension is 20 pounds, +5.0 or -5.0 pounds at 70°F (89 N, +22 or -22 N at 21°C).

(2) On the AFCS controller, push the AP button to engage the autopilot.

(a) PIT mode is automatically selected.

(3) Turn the pitch wheel on the autopilot controller to the DN position and select approximately 10 degrees down pitch.

(a) Make sure that when the control wheel hits the down stop (away from you) the trim wheel begins turning to the down direction.

(4) When the trim has run for several seconds:

(a) Push the CWS switch,

(b) Center the control column.

(5) Release the CWS switch and make sure that:

(a) Pitch command is discontinued.

(b) The command bars return to wings level.

(c) Control wheel does not change in pitch.

(6) Turn the pitch wheel on the autopilot controller to the DN position and select approximately 10 degrees up pitch.

(a) Make sure that when the control wheel hits the up stop (away from you) the trim wheel begins turning to the up direction.

(7) When the trim has run for several seconds:

(a) Push the CWS switch,

(b) Center the control column.

(8) Release the CWS switch and make sure that:

(a) Pitch command is discontinued.

(b) The command bars return to wings level.

(c) Control wheel does not change in pitch.

C. Yaw Servo Operational Check (Refer to Figure 601).

NOTE: Yaw damper will not move the rudder when the aircraft is on the ground. If the aircraft is in the "in air mode" and the AFCS system senses yaw rate or body longitudinal acceleration from the AHRS then the yaw servo will command a correction and move the rudder.

(1) Make sure that the cable tension is 20 pounds, +5.0 or -5.0 pounds at 70°F (89 N, +22 or -22 N at 21°C).

(2) On the control wheel, push the AP DISC switch to disconnect autopilot.

(3) Push rudder pedals and verify the rudder turns the direction pushed and that the system is free running (not engaged to the yaw servo clutch).

(4) On the AFCS controller, push the YD to engage the yaw damper.

(a) YD (green) is shown on each of the two PFD's.

(5) Push rudder pedals and make sure that:

(a) Servo clutch is slipping by detecting system friction.

(b) The rudder turns the direction pushed.

(6) On the AFCS controller, push the YD button to disengage yaw damper.

D. Put the Airplane Back to its Initial Condition.

Put the Airplane Back to its Initial Condition.

(1) Put the switches that follow are to the OFF position:

(a) BATTERY switch.

(b) EXTERNAL POWER switch.

(c) AVIONICS 1 and 2 switches.

(2) Disconnect external electrical power from the airplane.