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FAA APPROVED SUPPLEMENT TO PILOT'S OPERATING HANDBOOK AND/OR FAA APPROVED AIRPLANE FLIGHT MANUAL FOR BEECH MODELS 35-C33, 35-C33A, E33, E33A, F33, F33C, E33C, G33 AND F33A, S/N CE-315 AND BELOW WITH S-TEC SYSTEM 60 PITCH STABILIZATION SYSTEM (14 VOLT SYSTEM)

REG. NO. N2255A

SER. NO. CE 280

This Supplement must be attached to the applicable FAA Approved Airplane Flight Manual, Pilot's Operating Handbook, or Pilot's Operating Handbook and FAA Approved Airplane Flight Manual modified by the installation of S-TEC System 60 Pitch Stabilization System Model ST-051 installed in accordance with STC SA5173SW-D. The information contained herein supplements the information of the basic POH and/or AFM; for Limitations, Procedures and Performance information not contained in this Supplement, consult the basic POH and/or AFM.

SECTION I

GENERAL

This manual is to acquaint the pilot with the features and functions of the System 60 Pitch Stabilization System when installed in the listed aircraft model(s). The aircraft must be operated within the limitations herein provided when the pitch system is in use.

SECTION II

OPERATING LIMITATIONS

1. Pitch System operation not authorized above 178 KIAS (205 MPH IAS).
2. Pitch System must be off during take-off and landing.
3. Pitch System use prohibited during missed approach or go-around maneuver.
4. Flap defection limited to 20^{0} during Pitch System operation.
5. During operation of the Pitch System, limit bank angles to 30^{0} or less.

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SECTION III

EMERGENCY OPERATING PROCEDURES

In the event of pitch system malfunction, or any time the system is not performing as expected or commanded, do not attempt to identify the system problem. Immediately regain control of the aircraft by overpowering the pitch axis as necessary and then immediately disconnect the system. Do not reengage the system until the problem has been identified and corrected.

1. Disconnect (Standard System Without Autotrim)

   The system may be disconnected by:

   a. Depressing the OFF Switch on the programmer unit.
   b. Placing the PITCH STAB Switch in the OFF position.

2. Disconnect (Systems with Autotrim)

   a. In the event of a failure, manually control aircraft and DEPRESS AND HOLD, "Trim Interrupt/Pitch Stab Disconnect Switch" on control wheel.
   b. Place Trim Master Switch in OFF position, pull trim circuit breaker, release interrupt switch.
   c. Retrim aircraft. Leave trim system OFF until corrected.

   NOTE: Activation of the disconnect/interrupt switch will disconnect the pitch system and interrupt electric trim operation while the switch is depressed.

3. Altitude Loss During A Malfunction:

   a. A pitch system or autotrim malfunction during climb, cruise, or descent with a three second delay in recovery initiation could result in as much as a 320 ft. altitude loss. Maximum altitude loss recorded in a descent.

   b. A pitch system or autotrim malfunction during an approach with one second delay in recovery initiation could result in as much as 90 ft. altitude loss. Maximum altitude loss measured with flaps down 20^{0}, gear down and operating either coupled or uncoupled.

4. Caution Annunciations:

   The pitch stabilization system includes the following caution annunciations to advise the pilot of potential operating problems. Following is a list of the annunciations, their cause and recommended pilot actions.

ANNUNCIATION	CONDITIONS	ACTION
A. Flashing "VS"	Indicates excessive vertical speed error over selected VS (usually in climb).	Reduce command VS and/or adjust power
B. Flashing "GS"	Indicates off glide slope center line by 50% and/or glide slope flag in view	Check attitude and power and glide slope raw data display for flag. Add or reduce power as necessary for off course - check radio, execute missed approach, if glide slope flag extended.

NOTE: If any of the above annunciations occur at low altitude or during an actual instrument approach disconnect the system execute a go-around and inform ATC of the problem (IFR). Do not attempt to trouble shoot or otherwise ascertain the nature of the failure until a safe altitude and maneuvering area is reached.

SECTION IV

NORMAL OPERATING PROCEDURES

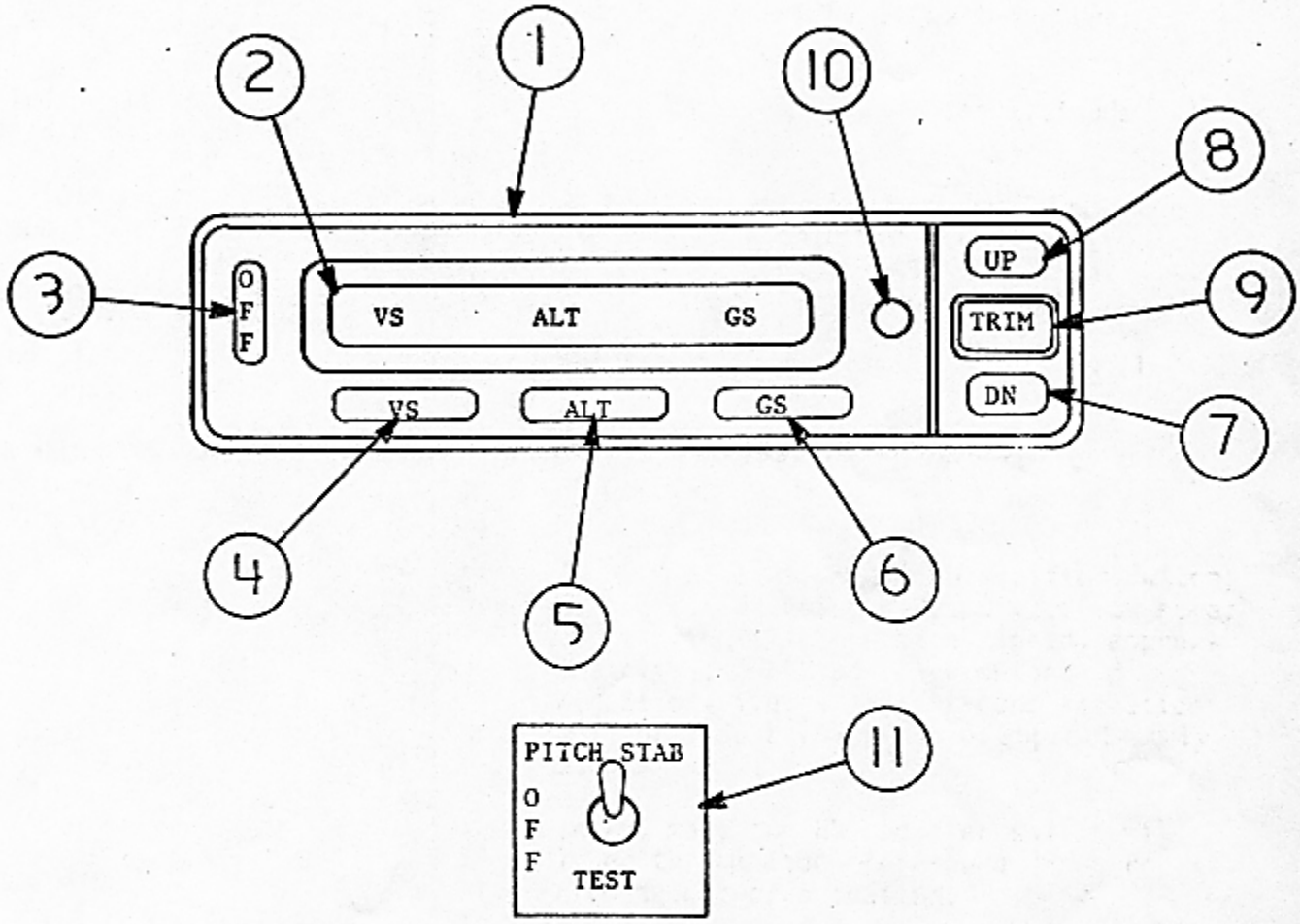
4-1 SYSTEM DESCRIPTION

The System 60 Pitch Stabilization System is a pure rate system providing control of the aircraft pitch axis. The system does not include or use a gyro or any of the panel instruments.

Pitch axis control is provided by deriving vertical speed, altitude position, altitude error and rate of vertical speed (acceleration) from a solid state absolute pressure transducer. The basic pitch modes provided are vertical speed, for use in climbs and descents, and altitude hold for maintaining a selected altitude (pressure) level. Pitch attitude changes to accomplish commands are limited by acceleration in operation, providing a very slow, comfortable, maneuvering rate.

The programmer unit includes an ambient light sensor which automatically adjusts annunciator and knob light intensity for prevailing ambient conditions. The system is entirely electrical and operates with very low power consumption.

4-2 COCKPIT CONTROLS AND FUNCTIONS



1. Mode Programmer and Annunciator Unit - Provides mode switches and annunciation for the system.

2. Mode Annunciator Window - Displays modes in use and armed modes (to the right of the active mode).

3. OFF - System disengage switch. Momentary actuation will clear all modes and disengage pitch servo.

4. VS (Vertical Speed) Mode Switch - Momentary actuation engages vertical speed mode. At engagement the system will synchronize the autopilot to the vertical speed existing at engagement.

NOTE: The vertical speed limits of the autopilot are ± 1500 FPM If the autopilot is engaged above 1500 FPM, it will maneuver to produce 1500 FPM.

5. ALT (Altitude) Mode Switch - Momentary actuation engages the altitude hold mode at the altitude existing at engagement.

6. GS (Glide Slope) Mode Switch - Momentary actuation will arm the GS mode when the aircraft is under the GS centerline. When armed the GS mode will engage automatically when the aircraft reaches the GS centerline. If the aircraft is above the GS centerline, momentary activation will engage the GS mode. Arming is indicated by the GS annunciation appearing with the ALT annunciation. At engagement, the ALT annunciation will extinguish leaving the GS annunciation.

7. DN (Down) Pitch Modifier Switch - The down modifier switch is used to modify the commanded vertical speed in VS mode or the altitude in altitude mode.

VERTICAL SPEED	In VS mode the down pitch modifier switch is used to increase descent vertical speed or decrease climb vertical speed, approximately 160 FPM per each second of actuation, i.e. a three second actuation will provide a VS change of approximately 500 FPM.
ALTITUDE CHANGE	In ALT mode the DN modifier switch will lower the altitude reference 20' per each second of actuation.

8. UP Pitch Modifier Switch - The UP pitch modifier switch is used to increase climb vertical speed and decrease descent vertical speed. In ALT mode it will cause an increase in the reference altitude. The rates of change are explained above for the down modifier (Item 7).

9. Trim Annunciation - Illuminates in conjunction with the appropriate UP/DN modifier switch button to indicate an out of trim condition and the direction to trim in order to reestablish a trimmed pitch condition.

10. Ambient light sensor - will adjust annunciator lamp and knob recognition lamp intensity automatically for optimum brilliance level.

11. PITCH STAB switch provides power to the Pitch Stabilization System. The switch is a three position switch having a PITCH STAB position, center OFF position and a TEST position.

4-3 PRE-FLIGHT PROCEDURES

NOTE: During system functional checks the system must be provided adequate D.C. voltage (12.0 VDC or 24 VDC minimum, as appropriate).

1. PITCH STAB Switch - Move to Test Position - Observe all messages illuminate. Move control wheel to center and push VS mode switch, move control wheel to check for engagement of the pitch servo. Hold control wheel and depress and hold UP modifier switch - after approximately ½ second pitch servo should disconnect. Release UP Modifier Switch - pitch servo should re-engage. Repeat for DN modifier switch. Move switch to PITCH STAB position.

   NOTE: The above pitch limiter check should be conducted once each flight day. If pitch servo does not disengage controls when UP and DN modifier switch are momentarily selected, the limit accelerometer may have failed. The pitch stabilization system should not be used until the problem is corrected.

2. Move control wheel to level flight position - Engage VS Mode - Depress UP Modifier Switch and hold - Observe control wheel moves slowly OUT. Depress DN Modifier Switch and hold - Observe control wheel moves slowly - IN.

3. Overpower Pitch By Pulling Control Wheel Out - Observe that TRIM Annunciator illuminates and DN modifier illuminates with audio tone - Overpower by pushing control wheel IN - Observe that TRIM annunciator illuminates and UP modifier illuminates with audio tone.

   NOTE: There will be approximately a 2-3 second delay between the overpower and the trim indication. If the trim lights do not function the system should not be used until the problem is corrected.

4. Disconnect - Momentarily depress the OFF switch. Move control wheel to assure freedom of the controls.
5. Electric Trim Check (If Optional Autotrim is installed)

   Manual Electric Trim - Test Prior To Each Flight

   A. Trim Switch and Pitch Stab Switch - ON
   B. Operate Manual Trim Switch (Both knob sections)
      NOSE DN - Check trim moves nose down and trim in motion indicator ("TRIM") in Pitch Stabilizer Programmer flashes. Operate trim switch NOSE UP - Check trim moves up and for "in motion" light.

C. With trim operating nose up and down - grasp manual trim control and overpower electric trim.
D. Operate each half of the trim switch separately - trim should not operate unless both switch knob segments are moved together.
E. With Trim Operating - Depress trim interrupt switch - Trim motion should stop while interrupt switch is depressed - when released trim should operate normally.

Autotrim

A. Engage VS mode of the pitch system.
B. Grasp control wheel and apply forward pressure (nose down) - After approximately three (3) seconds trim should run NOSE UP.
C. Apply aft pressure (Nose UP) to control wheel - after approximately three (3) seconds trim should run NOSE DOWN.
D. Move manual trim switch UP or DN - Pitch System should dosconnect and trim operates in the commanded direction.
E. Re-engage VS mode and depress Trim Interrupt/Pitch Stab Disconnect Switch - Pitch System should disconnect.
F. Retrim aircraft for take-off - Check all controls for freedom of motion and to determine that the pitch system and trim have disconnected.

If either the manual electric or autotrim fails any portion of the above check procedure, move the trim master switch OFF and do not attempt to use the trim system until the fault is corrected. With the trim master switch "OFF" the pitch system trim indicators and audio system will return to operation. If the electric trim system suffers a power failure in flight, the system will automatically revert to the indicator lights and audio horn. If this occurs turn the trim master switch OFF and trim manually, using the indicators, until the fault can be located and corrected.

4-4 IN FLIGHT PROCEDURES

VERTICAL SPEED

1. Place system switch in - PITCH STAB position - (Allow 10-15 seconds before engagement).
2. Engage VS Mode. Vertical speed mode will synchronize to the vertical speed existing at engagement if it is less than 1500 FPM. If the VS at engagement is more than 1500 FPM, the system will hold 1500 FPM.
3. To modify (change) vertical speed - Depress the desired UP-DN modifier switch as necessary. The UP-DN modifier switch will change the reference vertical speed approximately 160 FPM per each second of actuation. Thus to increase VS 500 FPM it will be necessary to hold the UP modifier for approximately three (3) seconds.

NOTE: The systems response to a command VS change is slow. When the modifier switch is depressed the aircraft will change attitude very slowly in the direction commanded. Do not hold the modifier switch depressed until the attitude change looks correct - remember the amount of modification is time related, 160 FPM per second of actuation.

ALTITUDE HOLD

1. At the desired altitude, depress the ALT Mode Switch. The ALT Hold will engage at the precise pressure level existing at engagement. In the event, that a difference exists between the altitude engage point and the altimeter the altitude may be modified as follows.
2. To modify the selected altitude, depress the UP-DN modifier switch, in the direction of desired change, for the required time period. The UP-DN modifier switch will change the reference altitude 20 feet per second of switch activation, i.e. if a barometric change requires a 40' climb to return to the desired altitude, depress the UP modifier switch for approximately two seconds. The aircraft will slowly change altitude to the new reference.

NOTE: The total range of the modifier in ALT mode is 200 feet of change. If more than 200 feet of change is required after ALT mode engagement, it will be necessary to return to VS mode and reselect ALT mode when the desired altitude is reached.

GLIDE SLOPE

The glide slope mode must be manually ARMED using the GS Mode Switch on the programmer. If the aircraft is below the glide slope centerline, actuation of GS mode switch will cause the GS mode to ARM, lighting the GS annunciator in addition to the ALT Annunciator. If the aircraft is above or on the GS centerline, actuation of the GS Mode Switch will arm and immediately engage the GS mode, which will extinguish the ALT annunciation leaving the GS annunciation illuminated. The GS mode can only be armed when operating in altitude (ALT) mode.

MANUAL ARM - AUTOMATIC ENGAGE

1. Check NAV Receiver on correct ILS frequency and that GS signal is valid (no flag).
2. Pitch Stabilization System in ALT mode, in bound to outer marker (O.M. or L.O.M.).
3. Select GS Mode Switch - GS Annunciator will illuminate indicating GS armed. At GS intercept the ALT annunciator will extinguish, leaving the GS annunciator and automatically engaging GS mode.

MANUAL ARM - MANUAL CAPTURE

If radar vectoring results in the aircraft being above the glide slope at the intercept point, the GS mode may be manually engaged as follows:

1. Select ALT mode (system will not arm from VS Mode).
2. Select GS Mode.

NOTE: If the glide slope receiver indicator is equipped with an external flag output which is connected to the pitch stabilization system, a GS flag in view will inhibit the glide slope mode. If the flag extends once the glide slope is engaged the GS annunciator will flash providing an active GS warning.

GLIDE SLOPE FLIGHT PROCEDURE

Approach the intercept point (usually the L.O.M.) with the flaps set to approach deflection of 10^{o} -20^{o} (See Limitations Section) and with the aircraft stabilized in altitude hold mode (ALT). Determine the GS signal is valid (no flag) and arm the GS by a momentary actuation of the GS Switch. At glide slope intercept, lower the landing gear and reduce the power for the desired descent speed. For best tracking results make power adjustments in small, smooth increments to maintain the desired airspeed. At the missed approach point or the decision height, disconnect the pitch stabilization system by actuation of the "OFF" Switch. If a missed approach is required, the system may be re-engaged after the aircraft has been reconfigured for and established in a stabilized climb.

ELEVATOR TRIM INDICATOR

The system pitch servo contains a sensor to detect the out of trim loads being imposed on the servo during maneuvers producing a trim change. When the out of trim force exceeds a preset amount, the TRIM annunciator will illuminate along with the UP-DN modifier switch button to indicate the direction of required trim. The annunciations will be accompanied by a low level audio signal and will be steady for approximately five seconds and will flash thereafter, until the aircraft is retrimmed. For instance, if the TRIM and UP lights are illuminated, you must TRIM UP to extinguish the lights and restore trim.

NOTE: If the trim indicator is illuminated and the system is disconnected there will be a residual out of trim force at the control wheel - be alert for this condition if you disconnect the system with the trim lights ON.

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AUTOTRIM (IF OPTIONAL AUTOTRIM IS INSTALLED)

If the pitch system is equipped with the optional electric autotrim system, the aircraft elevator trim will be maintained automatically when the TRIM Master Switch is ON and a pitch mode is selected. When autotrim is on, the trim indicator lights are disabled. Should the trim power fail or the switch be OFF, the indicator lights will return to operation automatically. Refer to Section 4-3 Pre-Flight Procedures for check-out information. The S-TEC electric trim system is designed to accept any type of single failure (either electrical or mechanical) without uncontrolled operation resulting. To assure that no hidden failures have occurred, conduct the trim preflight check prior to each flight.

NOTE: With optional autotrim system installed, do not overpower autopilot pitch axis for more than three (3) seconds because autotrim will operate to oppose the pilot causing an increase in overpower loads. If necessary to overpower the pitch axis, immediately disconnect the autopilot using the control wheel disconnect switch.

SECTION V

OPTIONAL DATA

Text of this Section not affected by installation of this equipment.

SECTION VI

REQUIRED OPERATING EQUIPMENT

Text of this Section not affected by installation of this equipment.

SECTION VII

WEIGHT AND BALANCE

Text of this Section not affected by installation of this equipment.

APPROVED _____
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