

CLIMB

Climb power (when safely clear
of obstacles or terrain)35" MP
2400 RPM
Mixture (26 GPH min. 450° CHT
max., 1550° EGT max.).....LEAN
Cowl flapsas required
Emergency fuel pumps.....OFF
Seat belts and no smoking
sign.....as required
Oxygen.....as required
Emergency fuel pumpsas required

CRUISE

Emergency fuel pumpsas required
Fuel selectorsOUTBOARD OR INBOARD
Powerset
Cowl flapsas required
Mixture.....leaned

DESCENT

Mixturesmin. 1350° EGT
Fuel selectorsINBOARD
Poweras required
Oxygen (below 10,000 ft.)OFF
Pitot and windshield heat.....as required

BEFORE LANDING

Seat belts and no smoking
sign.....ON
Emergency fuel pumpsON
Mixtures.....RICH
Prop synch.....OFF
Prop controls2400 RPM
GearDOWN
(below 129 KIAS in S/N
31-7712001 thru 7712103)
(below 156 KIAS in S/N
31-7812001 and up)
Gear lights3 green
Gear mirrorchecked
Brake pressurechecked
AutopilotOFF

Wing flaps.....as required down in steps
(164 KIAS max. 15° S/N 31-7712001
thru 7712103)
(174 KIAS max. 15° S/N 31-7812001
and up)
(174 KIAS max. 25° S/N 31-7912001
and up)
(140 KIAS max. full flaps)
Landing lightsas required

BALKED LANDING

Poweras required
GearUP
Wing flaps (15° till
clear of obstacles).....UP in steps

AFTER LANDING (CLEAR OF RUNWAY)

RadarOFF
Cowl flapsOPEN
Wing flapsUP
Emerg. fuel pumpsOFF
Heater switch (if used).....FAN
Prop controlsforward
Strobes.....OFF

SHUTDOWN

Parking brakeset
Avionics.....OFF
AP/FDOFF
ThrottlesIDLE
Mag groundingchecked
Throttles1000 RPM
LightsOFF
Heater switch.....OFF
Electrical equipmentOFF
Mixture (1st eng. started).....IDLE CUT-OFF
Gear handleDOWN
Gear handle (hydraulic
check).....returned to neutral
Mixture (2nd eng.)IDLE CUT-OFF
MagsOFF
Master switchOFF

4.24 CLIMB

When clearance above obstacles and terrain permits, reduce to Climb Power by setting the throttles to 35 inches Hg. manifold pressure and the propellers to 2400 RPM. Lean the mixture to a minimum fuel flow to 26 gallons per hour at a maximum exhaust gas temperature of 1550°F and maximum cylinder head temperature of 450°F. Adjust cowl flaps and mixture as necessary to maintain engine temperatures within limits.

Turn the emergency fuel pumps OFF one at a time, and check fuel gauges and warning lights. At power settings above 75%, maintain the mixture controls in the full RICH position except with the Climb Power setting when the mixture may be leaned as stated in the preceding paragraph.

Although the maximum approved operating altitude for this airplane is 24,000 feet, under standard atmospheric conditions and at maximum gross weight the multi-engine service ceiling and absolute ceiling are 26,300 feet and 27,300 feet, respectively.

4.25 CRUISE

During cruise, it is recommended that when the airplane is loaded to a rearward C.G., fuel from the outboard tanks be used first. This will tend to move the C.G. forward with fuel burn-off. Outboard tanks should be used during coordinated level flight only. If outboard tanks are used during climbs, descents or prolonged uncoordinated level flight, power loss may result even if there is appreciable fuel remaining.

Since inboard tanks must be used for landing, be sure to retain sufficient fuel in the inboard tanks for normal descent and landing in addition to reserve fuel for a possible go-around. It may be necessary to turn ON the emergency fuel pumps during cruise to stabilize fuel pressure.

The cruising speed of the Navajo is determined by many factors, including power setting, altitude, temperature, load and equipment installed. Refer to Section 5 - Performance - for power settings and performance under various conditions.

The Lycoming engines on this airplane can be cruised at any power level from 230 BHP to 170 BHP. An engine speed of 2500 RPM, may be used for maximum cruise performance, while a lower engine speed down to 2200 RPM may be used for more economical cruising conditions. (Refer to the Power Setting Table in Section 5 - Performance - for recommended power settings.)

During power changes, move the throttles slowly to the desired power setting, wait a few seconds for the system to stabilize, and then make critical adjustments, if necessary, after leaning the engines. Always return the mixtures to full rich before increasing power. To increase power, always increase RPM (propeller control) before increasing manifold pressure (throttle control). To decrease power, always decrease manifold pressure first, then RPM.

For maximum service life from the engines, maintain cylinder head temperatures below 435°F during high performance cruise operation and below 400°F for economy cruise power. At high altitudes the cylinder head temperatures can be maintained within normal limits through careful leaning and proper adjustment of the cowl flaps. It may be necessary at high altitudes to enrich the mixture, with partial cowl flap, to maintain normal temperatures.

Do not lean the engines above 75% power. Never exceed 1650°F EGT. Refer to Paragraph 4.37 for Leaning Procedures.

7.19 FUEL SYSTEM

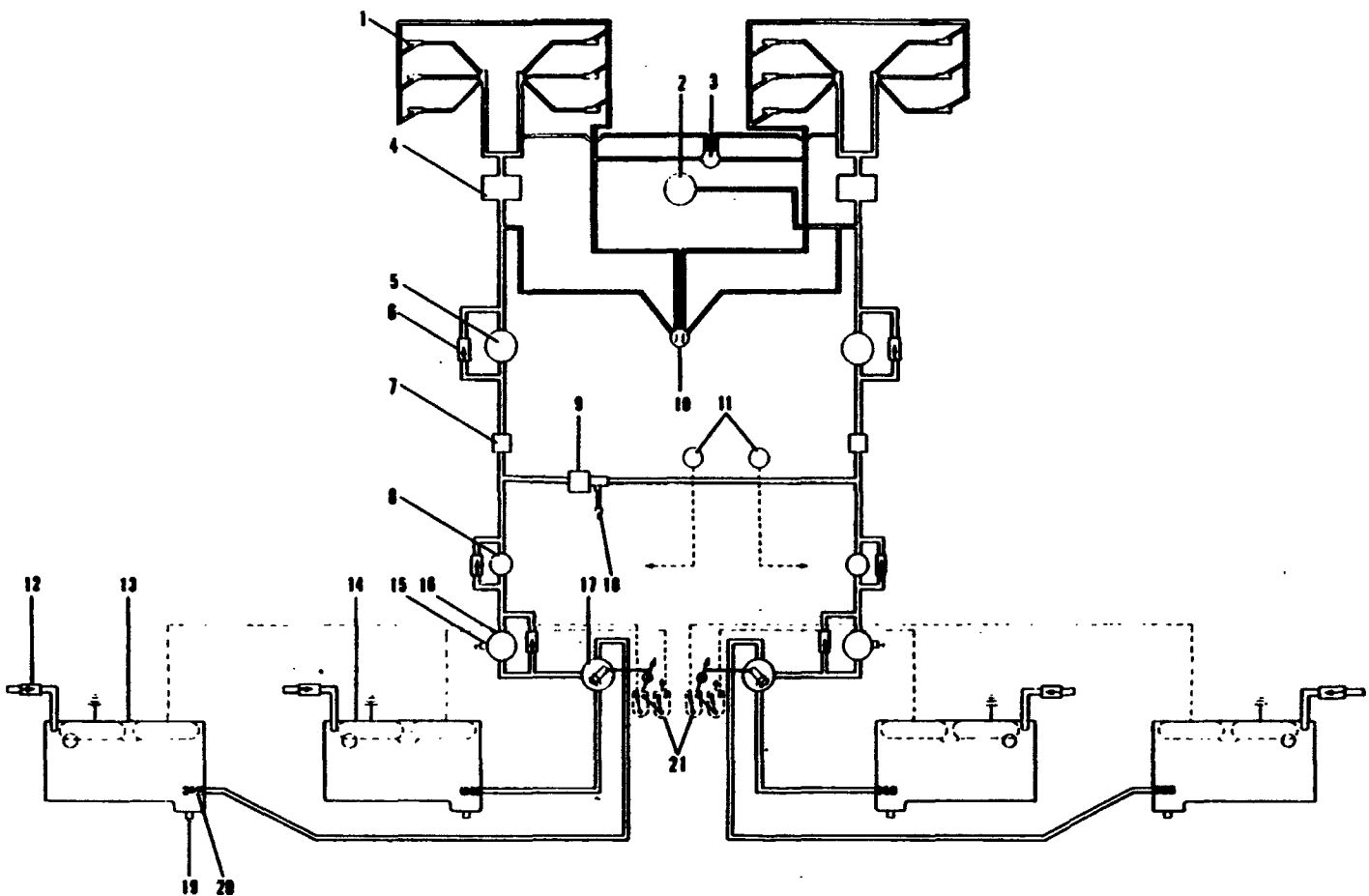
The fuel system consists of fuel cells, engine driven fuel pumps, emergency fuel pumps, fuel injectors, control valves, fuel filters, fuel pressure and flow gauges, fuel drains, non-icing NACA fuel tank vents and a fuel selector panel. (Refer to Figure 7-15.)

Fuel is stored in four flexible fuel cells, two in each wing. The outboard fuel cells have a capacity of 40 U.S. gallons each and the inboard cells have a capacity of 56 U.S. gallons each, providing a total fuel capacity of 192 gallons, 187.3 of which are usable. Each individual fuel cell incorporates its own fuel senders, screened outlet, sump drain valve, vent line check valves and filler assemblies available with optional lightning shielded caps.

The four fuel sump drains for the fuel tanks are located along the bottom of the wings: one just outboard of each wheel well and one on the inboard of each wing near the wing root fillet plate assemblies. On the fuel filter assemblies, attached to the inboard wing ribs, are fuel filter drains, accessible through a door on the bottom of the wing root fillet plate. A crossfeed drain is located on the left wing root fillet plate inboard of the tank drain. All of the fuel drains incorporate quick drain valves to provide speedy fuel contamination checks. (Refer to Section 8 - Airplane Handling, Servicing and Maintenance.)

The right and left wing fuel systems are independent of each other and are connected only when the crossfeed system is activated. Under normal operation, fuel is routed from the fuel cells, through the selector valve to the fuel filter. Fuel from the fuel filter travels through the emergency fuel pump, the fire wall shutoff valve and the engine driven fuel pump to the fuel injector and then to the cylinders.

Emergency fuel pumps are installed to provide fuel pressure in the event an engine driven pump fails. The emergency fuel pumps are also used under normal conditions for takeoff, landing, and priming the engines. It may also be necessary to turn on the emergency fuel pumps during climb or cruise to stabilize fuel pressure. Under high ambient temperature conditions the emergency fuel pumps may be turned on while taxiing to stabilize fuel pressure provided there is no indication of an engine driven fuel pump malfunction. Left and right emergency fuel pump switches are located on the overhead panel to the right of the fuel gauges.



- 1. FUEL NOZZLES
- 2. COMBUSTION HEATER
- 3. FUEL FLOW GAUGE
- 4. FUEL INJECTOR
- 5. ENGINE DRIVEN FUEL PUMP
- 6. CHECK VALVE
- 7. FUEL SHUTOFF VALVE

- 8. EMERGENCY FUEL PUMP
- 9. EMERGENCY CROSSFEED VALVE
- 10. FUEL PRESSURE GAUGE
- 11. FUEL QUANTITY GAUGE
- 12. FUEL TANK VENT CHECK VALVE
- 13. OUTBOARD FUEL TANK
- 14. INBOARD FUEL TANK

- 15. FUEL FILTER QUICK DRAIN
- 16. FUEL FILTER
- 17. FUEL TANK SELECTOR VALVE
- 18. CROSSFEED QUICK DRAIN VALVE
- 19. FUEL TANK QUICK DRAIN
- 20. FUEL TANK STRAINER
- 21. FUEL SENDER SELECTOR SWITCHES

FUEL SYSTEM SCHEMATIC

Figure 7-15

Two electric fuel quantity gauges are mounted in the overhead switch panel. The right fuel quantity gauge indicates the quantity of fuel in the selected right fuel system tank (right inboard or right outboard), and the left fuel quantity gauge indicates the quantity of fuel in the selected left fuel system tank (left inboard or left outboard). The fuel gauges are connected electrically to micro switches mounted in the fuel selector console. The fuel senders are also connected electrically to the micro switches. When a fuel tank is selected, its corresponding micro switch is actuated, completing the circuit between the fuel senders and the fuel quantity gauge, providing a visual reading of the fuel quantity in the selected tank. The gauges are illuminated, and the lights are controlled by a rheostat switch on the left side of the overhead switch panel.

Fuel flow and fuel pressure for the left and right engine fuel systems are monitored by a dual fuel flow gauge and a dual fuel pressure gauge. The fuel flow gauge, mounted on the instrument panel above and to the right of the control pedestal, measures both the right and left engine fuel system fuel flow in U.S. gallons per hour. The fuel pressure gauge, mounted on the instrument panel above and to the right of the copilot's control column, measures the fuel pressure in pounds per square inch for both the left and right engine fuel systems.

Right and left fuel flow warning lights illuminate to warn the pilot of an impending fuel flow interruption. The lights are activated by a sensing probe mounted near each inboard fuel tank outlet. In the event the fuel level near the tank outlet drops to a point where a fuel flow interruption and power loss could occur, the sensing probe will illuminate its corresponding warning light. The warning light will be on for a minimum of 10 seconds and will remain on if the cause is not corrected.

In airplanes with serial numbers 31-7712001 through 7712103, the warning lights are mounted at the base of the windshield divider post. The lights are provided with a "press-to-test" feature. To test, depress the button mounted between the lights for 3 seconds; the lights should illuminate and remain on for 10 seconds.

In airplanes with serial numbers 31-7812001 and up, the warning lights are incorporated in the annunciator panel. For press-to-test procedures in these later models, refer to Paragraph 7.24.

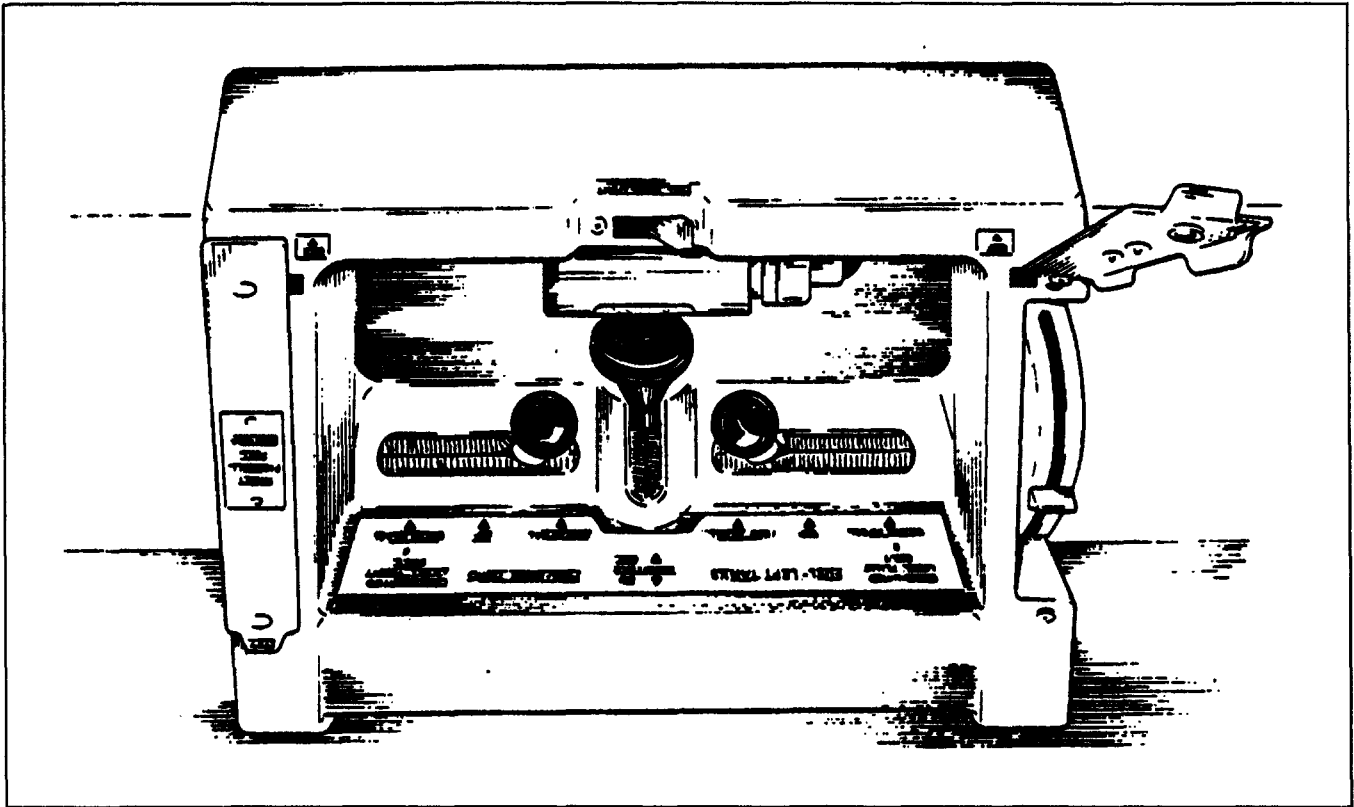
The fuel management (Figure 7-17) controls are located in the fuel system control panel mounted between the front seats on the forward edge of the wing spar carry-through cover. Located on the fuel control panel are the fuel tank selectors, fire wall fuel shutoffs and the crossfeed controls. A fuel control panel light and switch are mounted at the top of the panel.

During normal operation of the fuel system, each engine is supplied with fuel from its respective fuel supply. Selection of the controls on the right side of the control panel provides fuel from the right inboard or outboard fuel cells to the right engine and left fuel control selection provides fuel from the left inboard or outboard fuel cells to the left engine.

For emergencies, fuel from one system can supply the opposite engine through the use of the crossfeed system. The crossfeed valve is located at the inboard rib assembly of the left wing butt area and is intended for emergency use only. The crossfeed is controlled by a knob in the center of the fuel control panel, and under all normal conditions should be in the off (aft) position.

NOTE

The crossfeed system is not intended for normal operation. When the crossfeed valve is on, be certain the fuel selector valve on the tank not in use is off, and the procedures outlined in Section 3 - Emergency Procedures are followed.



FUEL SYSTEM CONTROL PANEL

Figure 7-17

Emergency fire wall fuel shutoff valves are installed in both the right and left engine fuel systems. The valves are actuated by controls on the left and right sides of the fuel system control panel. Since the fire wall shutoff valves are intended for emergency use only, they are provided with covers which must be lifted before the valves can be turned off. The covers are designed to prevent them from being closed when the fire wall shutoff valve controls are in the off position, preventing inadvertent activation and insuring a normal valve-open position with the cover closed. The valves are open when the lever is down.

Fuel to supply the combustion heater is provided by the right engine fuel system. (Refer to paragraph 7.37 in this section.)

SUPPLEMENT 9

**KFC 200 AUTOMATIC FLIGHT CONTROL SYSTEM
(WITH FLIGHT DIRECTOR INSTALLATION)**

SECTION 1 - GENERAL

This supplement is to acquaint the pilot with the operation of the KFC 200 Automatic Flight Control System with Flight Director as installed in the PA-31, Navajo. The airplane must be operated within the limitations herein specified.

This supplement has been "FAA Approved" as a permanent part of this handbook based on King STC No. SA1166CE and must remain in this handbook at all times when the optional King KFC 200 Automatic Flight Control System is installed.

The KFC 200 System with Flight Director may be operated as a Flight Director alone with the pilot steering the airplane to satisfy the Flight Director command presentation or the autopilot may be engaged to automatically steer the airplane to satisfy the Flight Director commands.

The KFC 200 System autopilot is certified in this airplane with two-axis control - pitch and roll- or three-axis control if optional Yaw Axis is installed. The optional third axis (Yaw) when installed gives three-axis damping and control whenever the autopilot mode is engaged. With the installation of an optional KC 291 Yaw Damper Mode Controller; Yaw Damping and turn coordination is available with or without the basic autopilot mode being engaged. Both the two-axis and three-axis version of the system are described in this supplement.

The airplane is equipped with an electric pitch trim system which is also used to accomplish automatic trimming to unload the autopilot elevator servo so that autopilot disengagement does not result in transient airplane motion. An autotrim/manual electric pitch trim monitor is provided in the autopilot. Autotrim and/or manual electric pitch trim faults are visually annunciated on the Mode Annunciator and accompanied by an audible warning.

This airplane is equipped with a manual electric pitch trim system designed to withstand any type in-flight single malfunction provided that the system is fully functional during the preflight operational check.

ABBREVIATIONS

AFCS	Automatic Flight Control System
ALT	Altitude or Altitude Hold
AP	Autopilot
APPR	Approach
ARM	System Arm for Capture
BC	Back Course
CDI	Course Deviation Indicator or Control
CPLD	Coupled
CWS	Control Wheel Steering
DISC	Disconnect
FDI	Flight Director Indicator
FCS	Flight Control System
FD	Flight Director System
GA	Go-Around
GS	Glideslope
HDG	Heading Select
NAV	Navigation
PAH	Pitch Attitude Hold
PNI	Pictorial Navigation Indicator
YD	Yaw Damper

SECTION 2 - LIMITATIONS

- (a) During autopilot operation, pilot must be seated at the controls with seat belt fastened. Operation is limited to the left-side pilot position.
- (b) Maximum speed for autopilot operation is 211 KIAS.
- (c) As the autopilot may mask high control forces necessary to counter an asymmetric ("split") flap condition, actuate the flaps only while the airplane is under manual control - not while the autopilot is engaged. Autopilot operation not authorized with greater than 15° of flap extension.
- (d) The autopilot must be disengaged during takeoff and landing.
- (e) System approved for Category I operation only (APPR or BC selected).
- (f) Autopilot attitude command limits:
 - Pitch $\pm 15^\circ$
 - Roll $\pm 25^\circ$
 - Yaw NA
- (g) The maximum altitude for operation of the autopilot has not been determined. The maximum altitude demonstrated during flight test was 24,000 feet.
- (h) Placards:

Location - Pilot's control wheel, left horn:

AP	TRIM
DISC	INTERRUPT

- Pilot's control wheel, left horn:

CWS

- Pilot's control wheel, left horn:

TRIM UP/DN

- Left throttle lever:

GO AROUND

Immediately adjacent to KA 285 Annunciator or KC 290 Mode Controller Panels:

**CONDUCT AFCS PREFLIGHT CHECK PRIOR TO FLIGHT IN
ACCORDANCE WITH FLIGHT MANUAL:**

Immediately adjacent to KC 290 (if equipped with a third axis without KC 291).

3 AXIS AP CONTROL

SECTION 3 - EMERGENCY PROCEDURES

(a) AUTOPILOT/YAW DAMPER DISENGAGEMENT

Disengage the Autopilot/Yaw Damper and/or prevent engagement by:

- (1) Pilot's AP DISC switch.
- (2) AP engage lever on Mode Controller and Yaw engage switch on Yaw Controller (on airplanes equipped with optional KC 291).
- (3) Pulling the AUTOPILOT circuit breaker.
- (4) Turning master switch OFF.
- (5) Turning avionics master switch OFF.

(b) AUTOMATIC AUTOPILOT DISENGAGEMENT

Any of the following will cause the autopilot to automatically disengage:

- (1) External power failure.
- (2) Actuating manual electric trim.
- (3) Internal Flight Control System failure.
- (4) With KCS 55A system a loss of compass valid (displaying HDG flag) disengages the AP and FD when a mode using heading information is engaged. With compass flag present only FD and vertical modes can be selected.

(c) MANUAL ELECTRIC PITCH TRIM

Manual electric pitch trim can be disengaged by pressing AP DISC/TRIM INTERRUPT switch and holding down until recovery can be made. Then turn off AVIONICS MASTER switch and manually retrim the airplane using the manual trim control wheel. After the airplane is trimmed out, pull the (PITCH TRIM) breaker and turn the AVIONICS MASTER switch back on.

(d) MAXIMUM ALTITUDE LOSSES DUE TO AUTOPILOT MALFUNCTION

(1) Cruise, Climb, Descent	400 feet
(2) Maneuvering	60 feet
(3) APPR	60 feet
(4) SE APPR	60 feet

CAUTION

OVERPOWERING THE AUTOPILOT IN THE PITCH AXIS FOR PERIODS OF THREE SECONDS OR MORE WILL RESULT IN THE AUTOTRIM SYSTEM OPERATING IN THE DIRECTION TO OPPOSE THE PILOT AND WILL, THEREFORE, CAUSE AN INCREASE IN THE PITCH OVERPOWER FORCES AND, IF AUTOPILOT DISENGAGED, WOULD RESULT IN A PITCH TRANSIENT CONTROL FORCE.

(e) ENGINE FAILURE (Coupled)

- (1) Disengage AP
- (2) Follow basic Airplane Flight Manual single-engine procedures.
- (3) Airplane rudder and aileron axes must be manually trimmed prior to engaging autopilot for single-engine operations.

CAUTION

IF RUDDER AND AILERON CANNOT BE MAINTAINED WHEN POWER IS CHANGED DURING A SINGLE-ENGINE COUPLED APPROACH OR GO-AROUND, DISENGAGE AUTOPILOT AND CONTINUE APPROACH/GO-AROUND MANUALLY.

SECTION 4 - NORMAL OPERATING PROCEDURES

- (a) The airplane MASTER SWITCH function is unchanged and can be used in an emergency to shut off all electrical power while the problem is isolated.
- (b) The AVIONICS MASTER switch supplies power to the avionics bus bar of the radio circuit breakers, AUTOPILOT and PITCH TRIM circuit breakers.
- (c) The KFC 200 is controlled by the following circuit breakers:

AUTOPILOT - This supplies power to the FCS KC 295 Computer, KC 290 Mode Controller, KA 285 Annunciator Panel, KI 256 FDI if used, and AP Pitch and Roll Servos. When optional yaw damper system is installed, this breaker also supplies power to the KC 296 Yaw Computer, the Yaw Servo, and the optional KC 291.

AVIONICS MASTER - This in conjunction with the AVIONICS MASTER Switch supplies power to the avionics bus.

COMPASS SYSTEM - This supplies power to the KCS 55/55A Compass System.

PITCH TRIM - This supplies power to the FCS autotrim and manual electric pitch trim systems.

(d) PILOT'S CONTROL WHEEL SWITCH FUNCTIONS

AP DISC/TRIM INTERRUPT - This emergency disconnect switch will disengage the AP and/or YD, interrupt the power to the electric system. To resume AP control, the AP lever on the Mode Controller must be re-engaged. In the event of electric trim or autotrim failure, the switch can be held depressed, which removes all power from the trim system to allow the pilot time to turn off the AVIONICS MASTER switch and pull the (PITCH TRIM) circuit breaker.

CWS - This switch when depressed and held will allow the pilot to manually fly the airplane in pitch and roll without disengaging the AP. When the switch is released the AP will resume control, (within the pitch and roll attitude limits). The CWS switch will resync the FD in PAH, or ALT hold mode and will transfer the GA mode to PAH. When the CWS is held depressed, manual electric pitch trim may be operated without disengaging the AP.

TRIM UP/DN - Manual electric pitch trim is activated by a dual-action type switch that requires both halves be moved simultaneously for actuating up or down trim commands. Operation of the manual electric pitch trim switch will disengage the AP. (Except when CWS switch is held depressed as previously noted.) The third axis will not disengage with operation of manual trim switch if the airplane is equipped with a KC 291.

GA - The GA switch is located on the throttle and the operation of the switch will indicate a fixed angle of climb of 6 on the FDI. Selection of the GA Mode when in the APPR or NAV CPLD Mode will disengage the mode and revert to the FD Mode (wings level) for lateral steering. The AP, if engaged, will disengage. The AP, however, can be engaged or re-engaged with GA mode selected and will follow the pitch command to climb at the fixed angle.

(e) FCS WARNINGS FLAGS AND ANNUNCIATORS DESIGNATION AND OPERATION

FD - This warning flag, mounted in the Flight Director Indicator, will be in view whenever any of the following conditions are not met: KC 295 internal power valid, Vertical Gyro excitation valid, adapter board valid, or a FD mode not selected. (The KI 256 Flight Director Indicator does not have a warning flag. However, the command bars will be biased out of view whenever the system is invalid or a FD mode is not engaged.)

HDG/PWR* - This warning flag, mounted in the Pictorial Navigation Indicator, will be in view whenever the Directional Gyro information is invalid. If a HDG invalid occurs with either NAV, APPR, or HDG modes selected, the AP and/or FD is disengaged. Basic FD mode may then be re-engaged along with any vertical mode and the AP re-engaged. This flag is labeled HDG in the KCS 55A Compass System. *This warning flag is labeled PWR in the KCS 55 Compass System. All modes may be selected and will function with or without a PWR warning present.

TRIM - The TRIM warning light, located in the lower right corner of the annunciator panel, will flash and be accompanied by an audible warning whenever the following autotrim and/or manual electric pitch trim failures occur: Trim servo motor running without a command. The trim servo motor not running when commanded to run and the trim servo motor running in the wrong direction are monitored on autotrim only. The TRIM warning light flashes four times and the audible warning sounds when the test switch on the Mode Controller is depressed.

GS - The Glideslope valid (GS pointer being in view on PNI) has to be present before GS may couple. If, after GS CPLD, the valid is lost the system will flash the GS Annunciator and revert from GS CPLD to PAH with the FDI pitch steering bar providing pitch attitude steering information. If the GS valid returns the system will revert back to GS CPLD.

NAV - The NAV or APPR Modes (ARM OR CPLD) may be selected and will function with or without a NAV warning flag present. The FDI bank steering will continue to provide steering information with or without a valid NAV signal.

(f) BEFORE ENGAGING FLIGHT CONTROL SYSTEM

- (1) Verify that all circuit breakers for the system are in.
- (2) Allow sufficient time for the gyros to come up to speed and for the system to warm up (3-4 minutes).

(g) PREFLIGHT CHECK (Must be performed prior to each flight)

- (1) With no modes engaged and all valid flags retracted, depress the Test Button on the Mode Controller. The Yaw Damp ON light will illuminate and all annunciators will illuminate on the annunciator panel, including the three marker lights. Also, the red TRIM failure light will flash. At least four or more flashes must be observed to indicate proper operation of the autotrim/manual electric pitch trim feature and an audible warning should sound.
- (2) With the AP disengaged, run the following manual electric pitch trim checks.
 - a. Verify that the PITCH TRIM circuit breaker is in.
 - b. Actuate the left - side switch to the fore and aft positions. The trim solenoid should engage, but the trim should not run.
Actuate the right - side switch to the fore and aft positions. The trim solenoid should not engage and the trim should not run.
 - c. Run the trim from stop to stop. The time required is 61 ± 6 seconds.
 - d. Grasping the manual trim wheel, run the trim both up and down and check the overpower capability. (Check that the trim indicator moves with the wheel.)
 - e. Press the AP DISC/TRIM INTERRUPT switch down and hold. The manual electric pitch trim will not operate either up or down.
- (3) Engage the FD. Then engage the AP, depress the CWS switch, center the flight controls and then release the CWS switch. Apply force to the controls to determine if the AP can be overpowered.
- (4) Check the operation of the pilot's control wheel switch functions.
- (5) Engage the FD and AP and put in a pitch (UP) command using the vertical trim switch on the Mode Controller. Hold the control column to keep it from moving and observe the autotrim run in the nose up direction after approximately three seconds delay. Use the vertical trim switch and put in a pitch (DN) command. Hold the control column and observe the autotrim run in the nose down direction after approximately three seconds.
- (6) Engage the HDG mode and the AP. Set the HDG bug to command a right turn. The control wheel will rotate clockwise. Set the HDG bug to command a left turn. The control wheel will rotate counterclockwise.

CAUTION

**DISENGAGE THE AP AND CHECK THAT THE AIRPLANE
MANUAL PITCH TRIM IS IN THE TAKE OFF POSITION
PRIOR TO TAKE OFF.**

CAUTION

IF THE AUTOPILOT CIRCUIT BREAKER IS PULLED, THE RED "TRIM" FAILURE LIGHT ON THE ANNUNCIATOR PANEL WILL BE DISABLED AND THE AUDIBLE WARNING WILL CONTINUOUSLY SOUND INDICATING THAT THE FAILURE LIGHT IS DISABLED. IN THIS EVENT THE "PITCH TRIM" CIRCUIT BREAKER SHOULD BE PULLED AND IN-FLIGHT TRIM ACCOMPLISHED BY USING THE MANUAL PITCH TRIM WHEEL.

(h) IN-FLIGHT OPERATION

(1) Engage Procedure:

After takeoff, clean up airplane and establish climb. Engage the FD mode first, monitor flight controls and engage AP. The pitch attitude will lock on any attitude up to 15°.

Engaging and holding the CWS switch allows the pilot to momentarily revert to manual control while retaining his previous modes, except GA, and conveniently resuming that profile at his discretion.

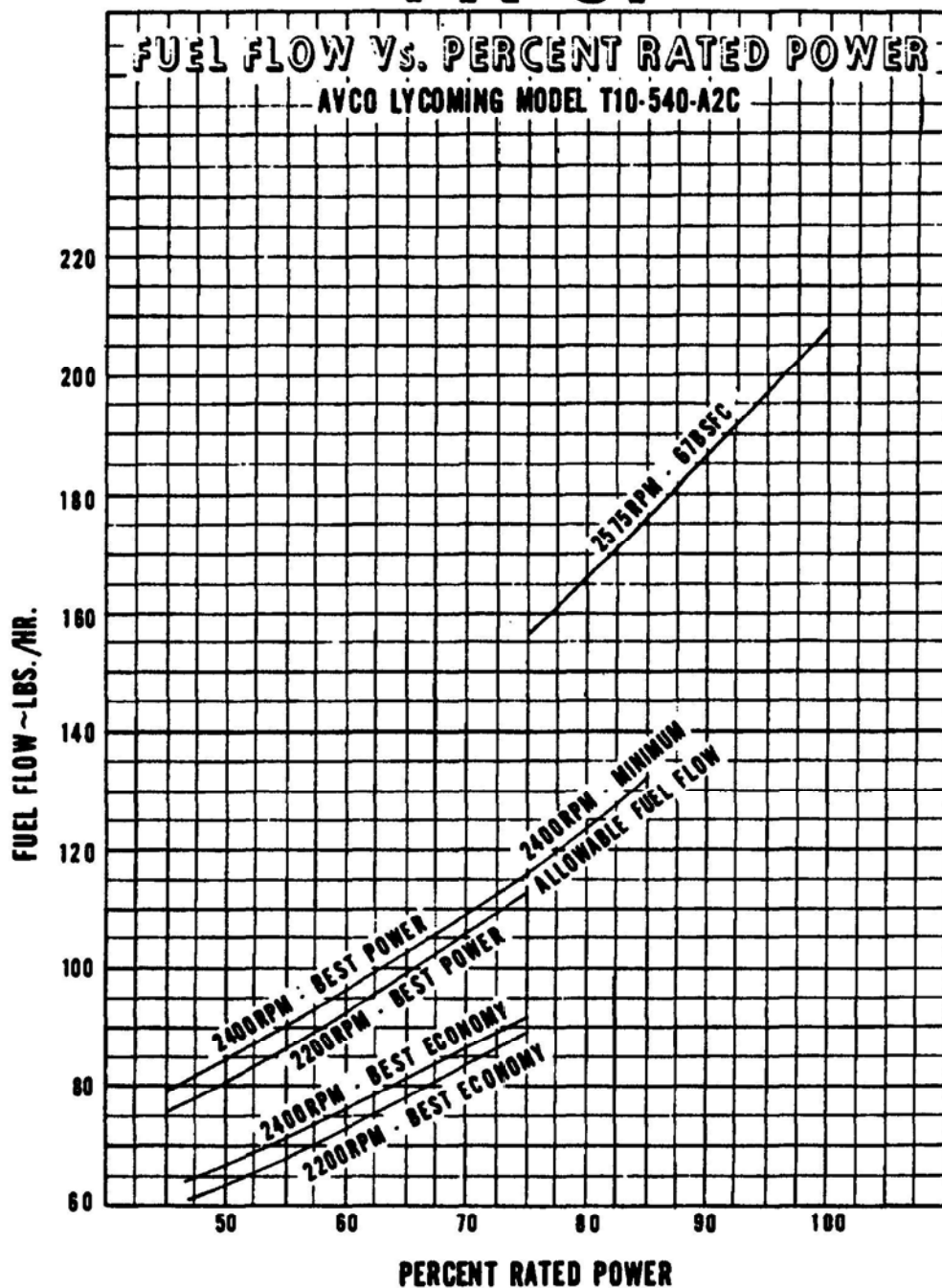
(2) Disengage Procedure:

Check the airplane trim by monitoring the command bars before engaging the AP. While monitoring the flight controls, disengage the system by one of the following methods: depressing the pilot's AP DISC/TRIM INTERRUPT switch, operating the manual electric pitch trim switch, or by operating the AP engage lever on the Mode Controller. The AP light on the annunciator panel will flash at least four times and remain off to indicate that the AP is disengaged. to deactivate the flight director system, depress the FD switch on the Mode Controller or press the AP DISC/TRIM INTERRUPT switch on the pilot's control wheel.

NOTE

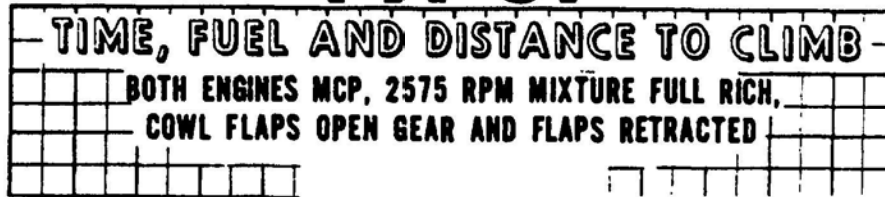
IF THE AIRPLANE IS EQUIPPED WITH AN OPTIONAL KC 291, THE OPTIONAL YAW DAMPER MODE WILL DISENGAGE WITH THE USE OF THE PILOT'S CONTROL WHEEL "AP DISC" SWITCH, BUT WILL NOT DISENGAGE AUTOMATICALLY WHEN THE MODE CONTROLLER "AP" SWITCH IS DISENGAGED OR WHEN THE MANUAL ELECTRIC PITCH TRIM IS OPERATED. THE YAW DAMPER CAN BE ENGAGED OR DISENGAGED AT ANY TIME BY DEPRESSING THE YAW CONTROLLER "YAW DAMP" SWITCH.

PA-31



FUEL FLOW VS PERCENT RATED POWER
Figure 5-39

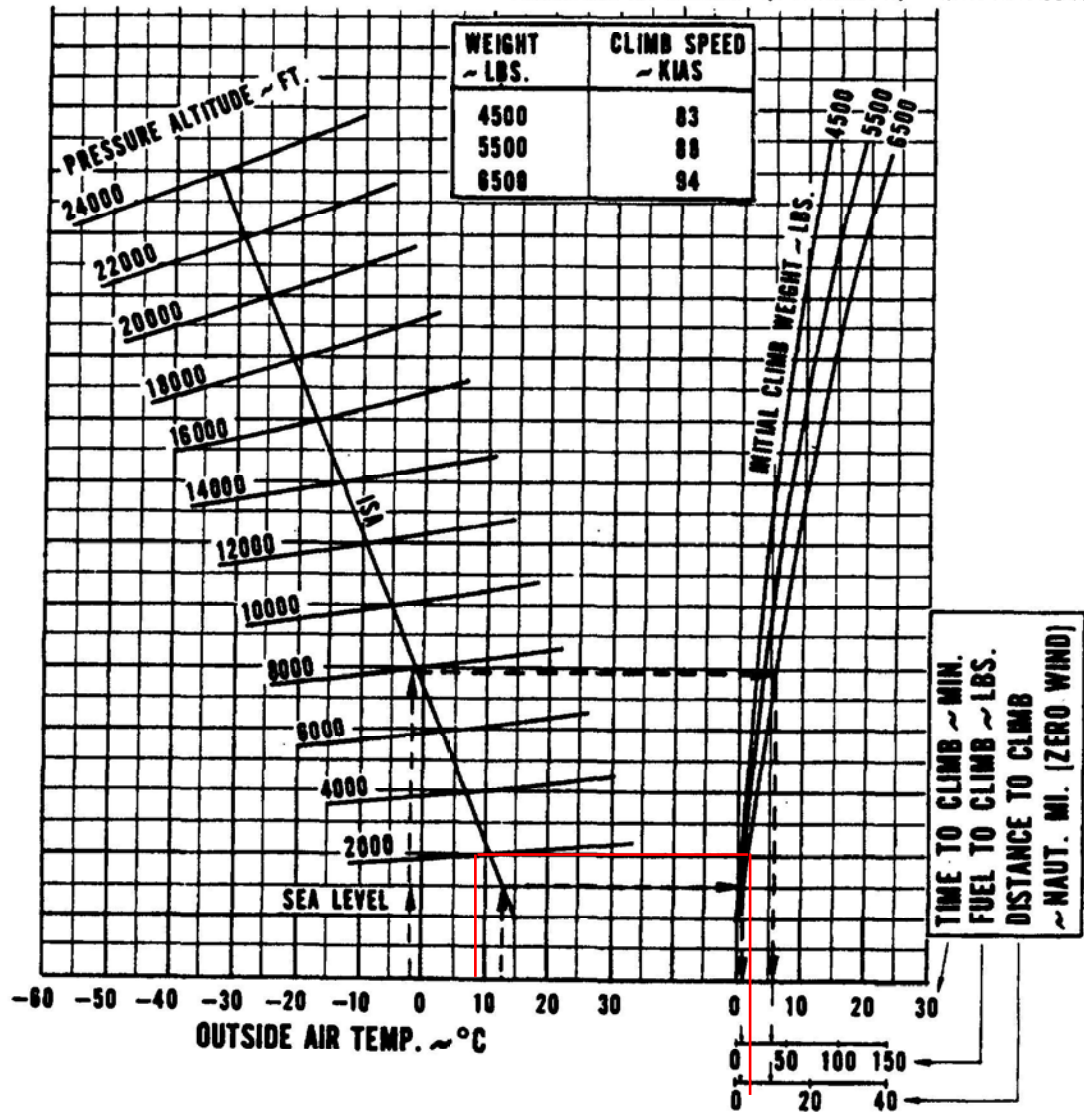
PA-31



Example:

Pressure altitude at airport: 1000 ft.
OAT at airport: 13 C
Pressure altitude at cruise: 8000 ft.
OAT at cruise: -2 C

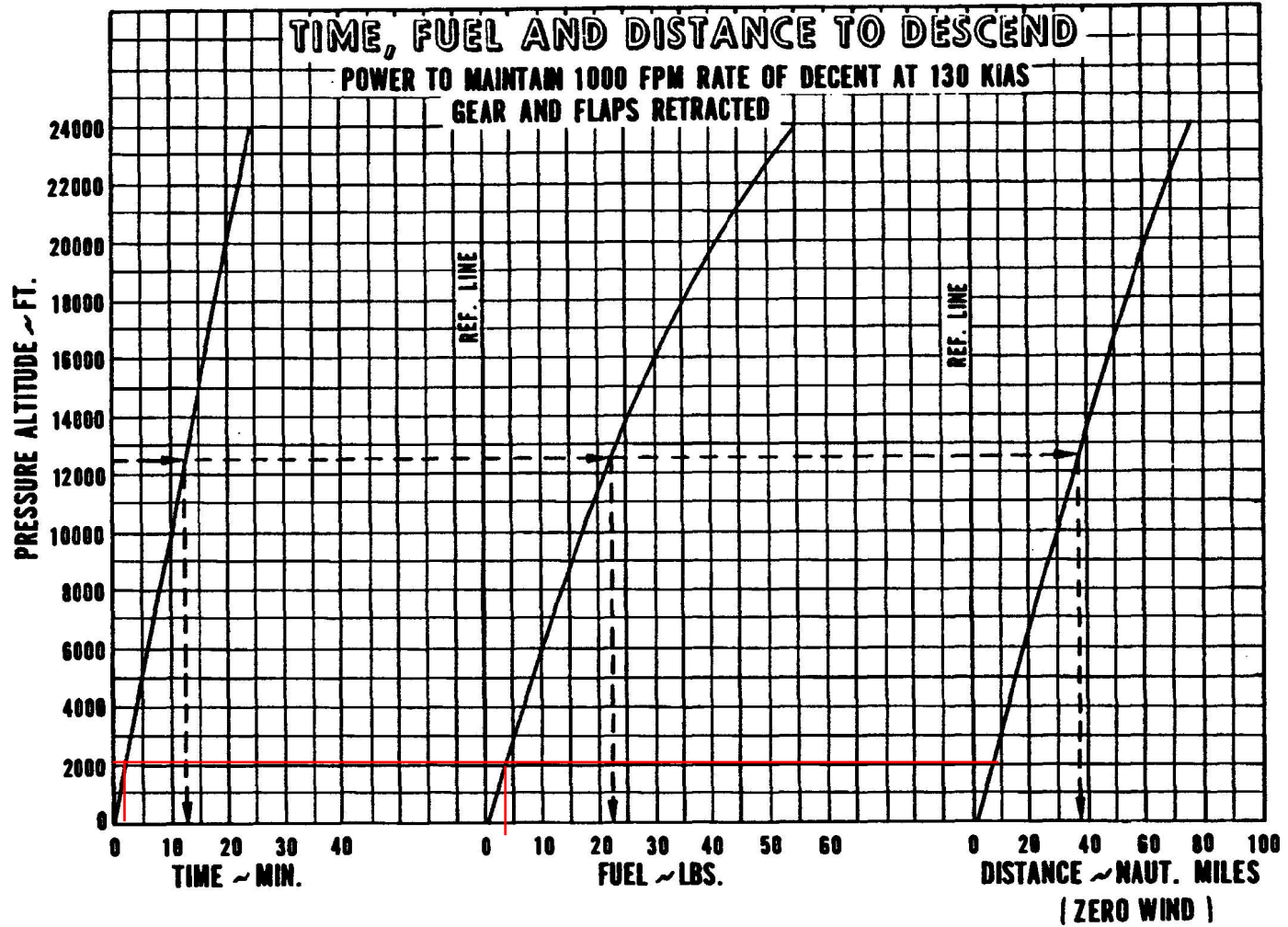
Initial climb weight: 6500 lbs.
Time to climb: (6 minus 1) = 5 min.
Fuel to climb: (35 minus 6) = 29 lbs.
Distance to climb: (9 minus 1) = 8 nautical miles



TIME, FUEL, AND DISTANCE TO CLIMB

Figure 5-25

PA-31



Example:

Pressure altitude: 12,500 ft.

Time to descend: 12.5 min.

Fuel to descend: 22.5 lbs.

Distance to descend: 36 nautical miles

TIME, FUEL, AND DISTANCE TO DESCEND

Figure 5-43