https://www.filefactory.com/file/1slhgt5b5uiz/LTV_A-7D%20Flight%20Manual.pdf

control knob actuates the self-test function. The set is automatically in the self-test mode whenever weight is on the gear.

VERTICAL VELOCITY INDICATOR.

An AAU-18A vertical velocity indicator, located on the instrument panel, senses atmospheric pressure changes to give a visual indication of rates of ascent and descent from zero to 6,000 feet per minute. A zero adjustment screw is accessible at the lower left front of the case. Electrical power for instrument lighting is controlled by rotation of the FLIGHT INST control on the right console.

ATTITUDE INDICATOR (STANDBY).

A remote standby attitude indicator is located on the instrument panel and is for emergency use in the event of failure of the primary attitude indicating system. The remote system displays airplane pitch and roll with respect to gravity vertical. The system functions through 360 degrees of roll attitude, but is limited to plus or minus 82 degrees from horizontal in pitch attitude. System components consist of a vertical displacement gyro, standby attitude indicator, and a rate switching gyro.

Displacement signals to drive the indicator are supplied by the vertical displacement gyro which senses aircraft pitch and roll attitude. The vertical gyro also supplies pitch displacement signals to the automatic flight control system (AFCS) pitch computer. The rate switching gyro disconnects the roll erection function in the displacement gyro to prevent false erection of the displacement gyro when the aircraft rate of turn exceeds 15 degrees per minute.

A STBY ATTD ERECT switch on the left console provides manual control of fast erection voltage of the displacement gyro. Actuation of the switch allows the pilot to speed up the normal erection rate until approximately level indications are obtained on the standby attitude indicator.

CAUTION

The fast erect circuit remains energized until the STBY ATTD ERECT switch is released. The switch should not be held in ERECT position for periods exceeding 30 seconds during any 2 1/2-minute period, as damage to the gyros may occur.

The system is powered by the primary ac bus. A power failure during operation will cause an OFF flag to appear on the indicator.

ANGLE-OF-ATTACK INDICATING SYSTEM.

The Angle-of-Attack Indicating System senses aircraft angle of attack and displays this information to the pilot.

Angle of attack is read from a dial-type indicator on the instrument panel and by approach indexer lights on the windshield frame. Indexer lights operate only when the landing gear handle is down. The angle-of-attack indicator operates during all flight phases. The indicator has preset (not adjustable by pilot) index markers to indicate the desired angle of attack for basic 1g flight conditions. Angle-of-attack indications are illustrated in figure 1—58. Angle-of-attack markers are illustrated in figure 1—59.

ANGLE-OF-ATTACK MARKERS

CONDITION	UNITS	MARKER
Maximum range	10.7	
Maximum endurance	13.4	
Landing approach	17.5	
Stall	23.0	

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Figure 1—59

USE OF SYSTEM AS AN EMERGENCY AIRSPEED INDICATOR.

If the airspeed indicator fails or is suspected to be erroneous, the angle-of-attack indicator can be used to establish desired flight conditions. Units angle of attack used to establish various flight conditions are presented in the Pitot-Static System Failures discussion in the Inflight Emergencies, Section III.

Note

If the airspeed indicator is lost or suspected to be erroneous, the TAS indicator may be similarly affected.

THE MECHANICS OF SYSTEM OPERATION.

The angle-of-attack indicator receives signals from a transducer located on the left side of the fuselage. The indicator reflects indicated angle of attack (true angle is less than indicated). In the region of the optimum

approach angle of attack, each unit on the indicator dial is equal to 1.5 degrees of indicated angle of attack or approximately 5 knots indicated airspeed.

The transducer also supplies signals which actuate the stall warning system and cause automatic cutoff of AFCS roll augmentation. If angle of attack reaches 20.5 units, a switch in the angle-of-attack indicator closes to complete a circuit which causes the right rudder pedal to shake. If angle of attack reaches approximately 22 units, a circuit is completed which automatically cuts off AFCS roll augmentation to prevent pro-spin aileron from being applied by the AFCS.

The angle-of-attack indicator controls operation of the approach indexer to provide indications of high, optimum, and low angles of attack in the landing condition. The indexer is operated relative to pointer movement about the reference index marker at the 3 o'clock position on the indicator.

Due to an allowable indicator tolerance of plus or minus 0.5 units, the pointer position on an indicator may be as high as 18.0 or as low as 17.0 units when the angle-of-attack vane is in optimum position (17.5 units). Each indicator should be adjusted to bring pointer and scale to the center of the index marker at the 3 o'clock position, provided the allowable tolerance is not exceeded.

On aircraft → [16] [18] → [26], the approach indexer lights function when the landing gear handle is in WHLS DOWN and the APPROACH INDEXER dimming knob is rotated out of the OFF position. On aircraft [17] [27] →, functions of the APPROACH INDEXER dimming knob are controlled by the WINDSHIELD BOW lights dimming knob. Light intensity is controlled by positioning either dimming knob as desired out of the OFF position.

A pilot preflight check is performed during the exterior inspection to ensure that the angle-of-attack vane or arm is not bent.

ELECTRICAL POWER.

Power for the Angle-of-Attack Indicating System and Stall Warning System is supplied by the emergency dc bus.

CANOPY.

The canopy consists of an aluminum frame with the optical portion formed of stretched acrylic plastic. Normally, the pilot or ground crewman opens and closes the canopy manually. Manual operation is made possible by a pneumatic counterbalance cylinder. In the event the canopy jams or cannot be opened manually, it can be jettisoned by means of a pyrotechnic impulse cartridge. Jettisoning is accomplished by use of exterior or cockpit-mounted emergency jettison handles or through seat ejection.

The canopy is locked in the closed position by four rotating hooks. The hooks rotate up into the canopy and engage four rollers in the canopy frame. A CANOPY not locked light on the caution panel (right console) illuminates when the canopy is unlocked. The instrument panel-mounted MASTER CAUTION light also flashes.

Safety pins that must be removed prior to flight include the interior canopy jettison initiator (forward side, left longeron), the ejection seat initiator (upper left side of seat), and canopy actuated initiator (aft near canopy actuator).

NORMAL OPERATION.

The canopy is locked and unlocked by a release handle on the right side of the cockpit. Pulling the handle aft unlocks the canopy. Pushing the handle forward locks the canopy. When not in use, the handle may be telescoped to the stowed position to give better access to the right console-mounted controls. With the canopy unlocked, it automatically raises to the full open position. A slight downward pull closes the canopy. A closing handle located at the top of the canopy bow aids in opening and closing. The canopy should be held during all opening and closing to avoid undue stress on the shearpins that could lead to inflight canopy loss.

CAUTION

The throttle will be placed in IDLE before opening or closing the canopy with the engine running. Open the canopy slowly in cold weather. Hydraulic dampening fluid in the canopy actuator flows less freely at lower temperatures. Therefore, rapid movement of the canopy could shear the canopy actuator shearpin.

Note

During ground operations and with the canopy open, a tailwind of approximately 15 knots causes the canopy to slowly lower to the closed position.

An exterior canopy release handle located on the left side of the aircraft and below the canopy rail is provided to permit locking and unlocking from the outside. The handle is flush-mounted with the surface and springs out when the handle latch is released. Turning the handle counterclockwise unlocks the canopy, and turning the handle clockwise to the horizontal position locks the canopy. When the handle is in the stowed position, it is disengaged from the canopy locking mechanism.

Note

To prevent damage to the exterior release handle, it should be returned to the stowed position before entering the cockpit and operating the interior release handle.

ANGLE-OF-ATTACK INDICATIONS

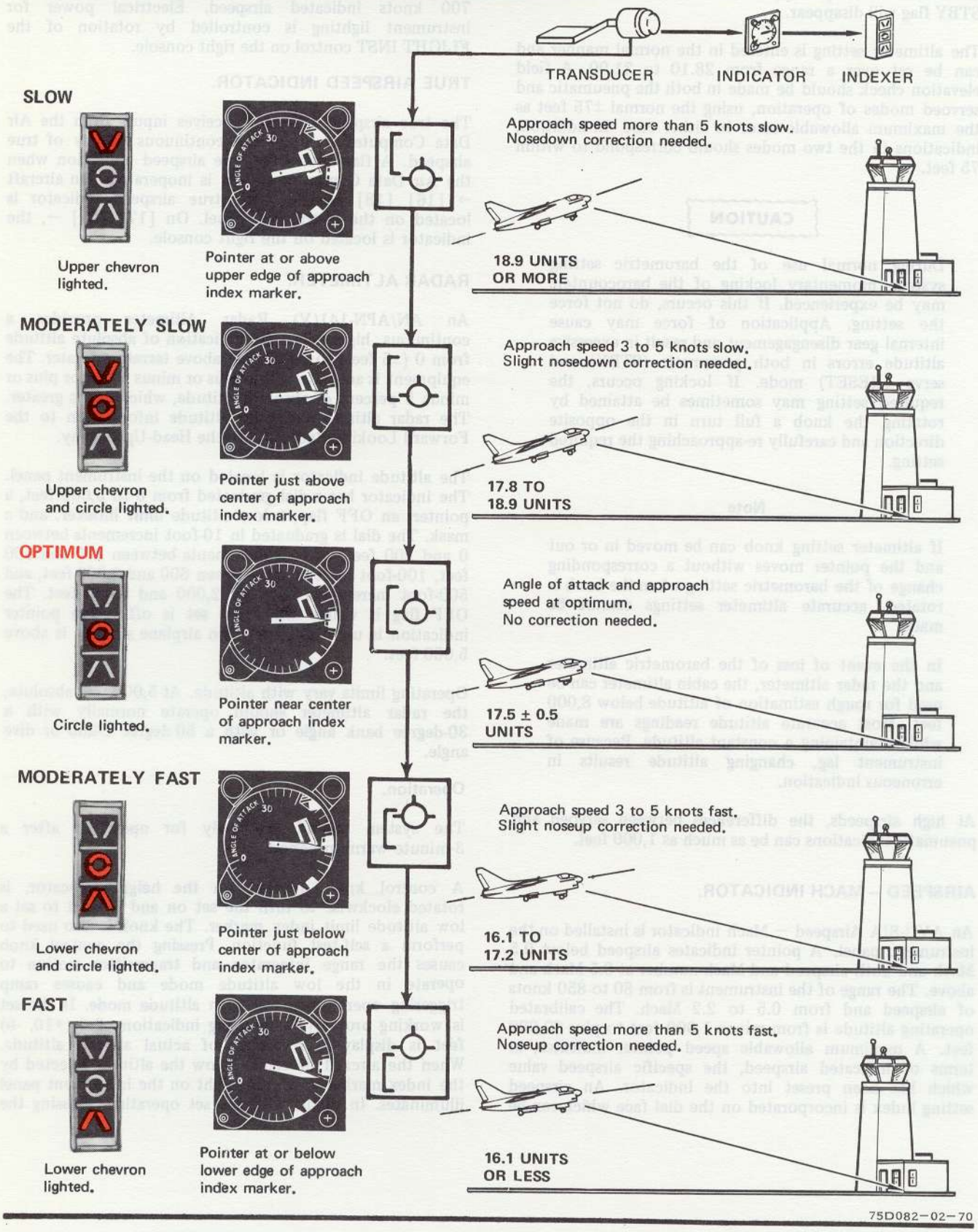


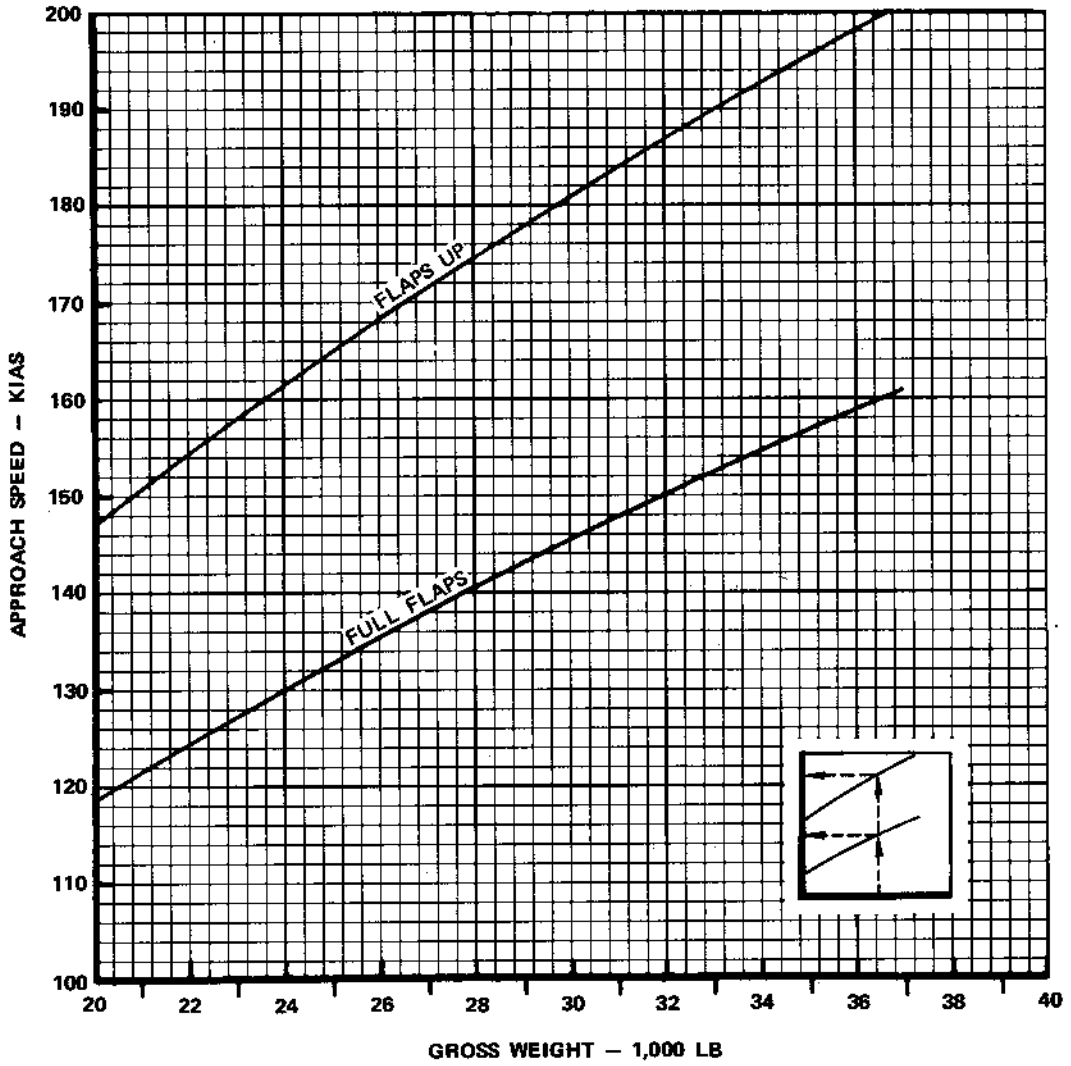
Figure 1–58

LANDING SPEED SCHEDULE

17.5 UNITS ANGLE OF ATTACK
CG = 26% MAC

MODEL: A-7D
DATE: MARCH 1971
DATA BASIS: FLIGHT TEST

ENGINE: TF41-A1
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/US GAL.



NOTE

1. Subtract 5 knots for touchdown speed.
2. Modify speed ±1/2 kn per ±1% CG shift (+CG fwd; –CG aft).

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Figure A7–1