NAVAL AIR TRAINING COMMAND

INTRODUCTION TO THE T-28 AIRCRAFT

UC 09 03 01 01 EL

CNAT P-1131 (Rev. 1-82) PAT

ENGINEERING
PRIMARY

1982

NAVAL AIR STATION · CORPUS CHRISTI, TEXAS

CHIEF OF NAVAL AIR TRAINING
NAVAL AIR STATION
CORPUS CHRISTI, TEXAS 78419

Code 313

19 JAN 1982

1. CNAT P-1131 (Rev. 1-82) PAT, "Introduction to the T-28 Aircraft, UC 09 03 01 01 EL, T-28 Engineering, Primary," is promulgated for information, standardization of instruction and guidance of instructors and students in the Naval Air training Command.

2. This publication will be used to implement the academic portion of the Primary curriculum.

3. Recommendations for changes shall be submitted to the Commander, Training Air Wing FOUR.

4. CNAT P-1131 (Rev. 11-75) PAT is hereby canceled and superseded.

Joe L Shaw

J. L. SHAW
Assistant Chief of Staff for
Training and Operations

Distribution:
CNATRA (4)
COMTRAWING FOUR (4) PLUS ORIGINALS
COMTRAWING FIVE (4)
CO, NAS CORPUS CHRISTI (750)
CO, NAS WHITING FIELD (400)

TABLE OF CONTENTS

NAVAL AIR TRAINING COMMAND

PRIMARY PHASE

DISCIPLINE: Engineering

COURSE TITLE: Engineering, T-28 (Primary)

UNIT: Introduction to the T-28 Aircraft

PREREQUISITES: None

FOR INSTRUCTIONAL PURPOSES ONLY

SCOPE: The purpose of this unit is to acquaint the student with the basic aircraft characteristics, features, and a brief introduction to the major systems and components associated with the T-28.

SPECIFIC INSTRUCTIONAL OBJECTIVES

Affective Domain

1. To provide the student with the opportunity to consider the general features of the T-28, specifically power plant, dimensions, major components, manufacturer, and performance capabilities (Receiving).

2. To cause an appreciation of the capabilities of the aircraft as compared with other aircraft flown in the past (Valuing).

3. To require the student to respond correctly to specific questions regarding general characteristics and features of the aircraft (Responding).

Cognitive Domain

Upon completion of this unit, the student will:

1. Recognize the external differences between the T-28B and the T-28C (Knowledge).

2. State the power plant for the T-28 and its takeoff power (Comprehension).

3. Recall the buttons/switch on the throttle (Knowledge).

4. Name the communication transceiver and the primary navigational systems in the T-28 (Knowledge).

5. State the T-28 fuel capacity (Comprehension).

6. State the components in the T-28 which are hydraulically operated by system pressure (Comprehension).

7. State the sources of d.c. and a.c. power in the T-28 (Comprehension).

8. Recall the function of the electrical control shift switch (Knowledge).

9. Recall the location of the primer and starter buttons and how they are powered (Knowledge).

Psychomotor Domain

None.

INSTRUCTIONAL MATERIALS

The following items are provided for each student:

1. NATOPS Flight Manual, Navy Model T-28B/C Aircraft, NAVWEPS 01-60FGB-1.
2. Engine Cutaway, R-1820.

When the student has assembled the materials listed above, he will proceed in accordance with the following directions:

DIRECTIONS TO STUDENT

STEP 1 Complete the programed text.

STEP 2 Take the unit criterion test.

STEP 3 End of this unit. Remedial sessions prescribed if necessary.

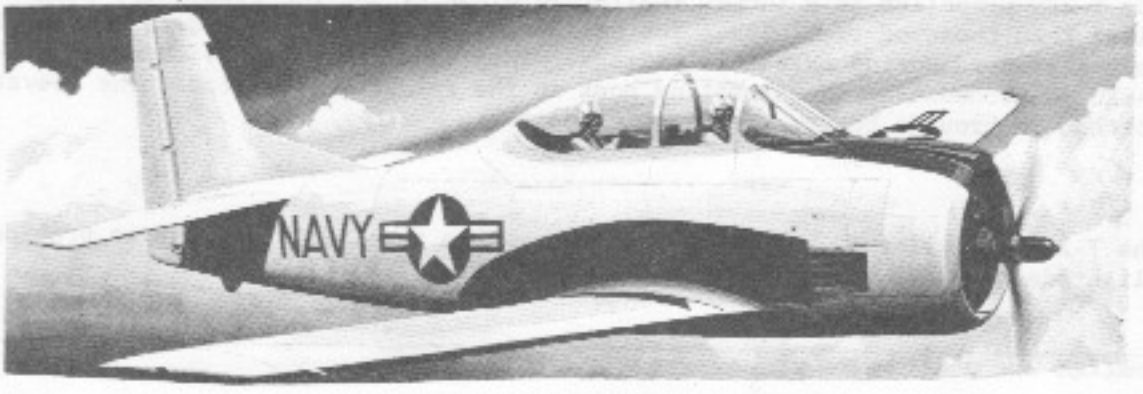
PROGRAM PERFORMANCE VALIDATION RECORD

This instructional sequence was introduced at NAS Whiting Field on 9 August 1971. This unit was validated on 14 April 1975.

Reverse Blank

FRAME 1

Welcome to the world of the T-28. The T-28B and T-28C are straight-wing, high-performance trainers, equipped with dual controls. Built by North American, Columbus, Ohio Division, the T-28C is a carrier version of the T-28B and maintains the same outward appearance except for the addition of a tail hook and minor modifications of the tail.



T-28B

T-28C

FIGURE 1

The basic external difference between the T-28B and the T-28C is that the _____ is designed for carrier duty.

T-28C

FRAME 2

Other differences in the two aircraft are in the propeller and rudder shape. Both aircraft have a speed brake located on the bottom of the fuselage, and, with a few exceptions, both cockpits contain identical controls and instruments. The cockpits were designed and arranged to be as much like a fighter as possible.

The T-28C propeller is 9 inches smaller in diameter and the blades are slightly wider than those of the T-28B. The smaller diameter prop is used to provide flight deck clearance during arrested landings. The rudder is slightly shorter on the T-28C to accommodate the arresting hook in the retracted position. The elevator is notched to provide better aerodynamic control.

The T-28C propeller is_____in diameter than the T-28B in order to provide flight deck_____during arrested landings.

smaller ... clearance

FRAME 3

The power plant used is a nine-cylinder, radial, air-cooled Wright Cyclone engine, Model R-1820-86. At takeoff power at sea level under standard conditions, the engine develops 1425 horsepower. Engine exhaust outlets on the side of the engine are designed to utilize the additional thrust available from the jet effect of the exhaust. The engine is equipped with a single-stage, two-speed, engine-driven supercharger, a direct-cranking starter, and a pressure injection type carburetor.

The____-cylinder R-1820-86 engine develops_____horsepower on takeoff at sea level under standard conditions and receives extra thrust as the result of the jet effect from the_____.

9 ... 1425 ... exhausts

FRAME 4

The propeller is a Hamilton Standard Hydromatic constant-speed propeller with three blades. The double-capacity governor is a governor designed for use with certain blade designs which have higher centrifugal twisting moment than can be controlled by a single-capacity governor. This governor, controlled by mechanical linkage from either cockpit, maintains a selected RPM, regardless of varying airspeed or flight loads. The governor and its oil pump assembly are contained within a constant-speed control housing mounted on the nose section of the engine.

The propeller is a_____ _____ _____with____blades and is a_____ _____type.

Hamilton Standard Hydromatic ... 3 ... constant - speed

FRAME 5

Other physical characteristics of th T-28 in general are as follows: The aircraft is 33 feet in length, has a 41-foot wingspan, is 13 feet in height to the top of the vertical stabilizer, and weighs approximately 8,000 pounds. Some versions are modified to carry various types of ordnance, including rockets, bombs, and pod-mounted machine guns.

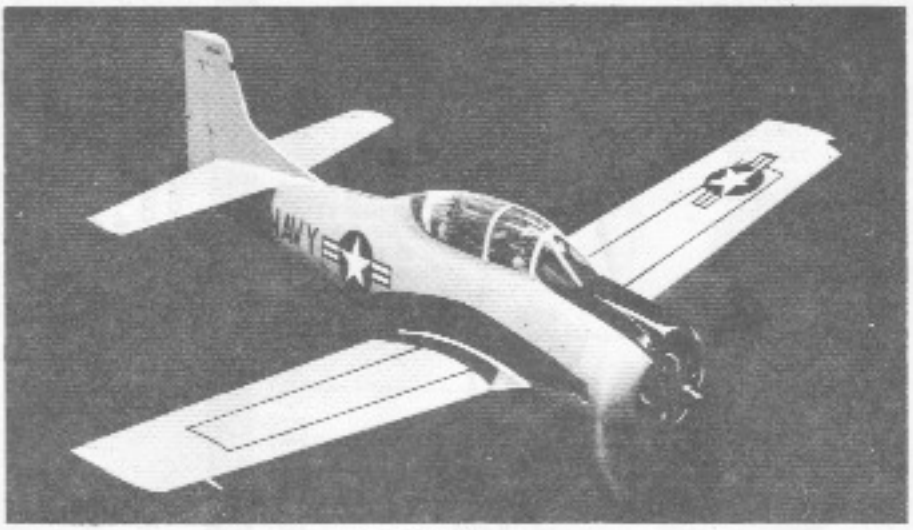


FIGURE 2

No response required.

FRAME 6

Study the following figures in detail before proceeding with this unit. Locate each instrument and control in the cockpit, in addition to visualizing the location within the airframe of each component in the general arrangement diagrams.

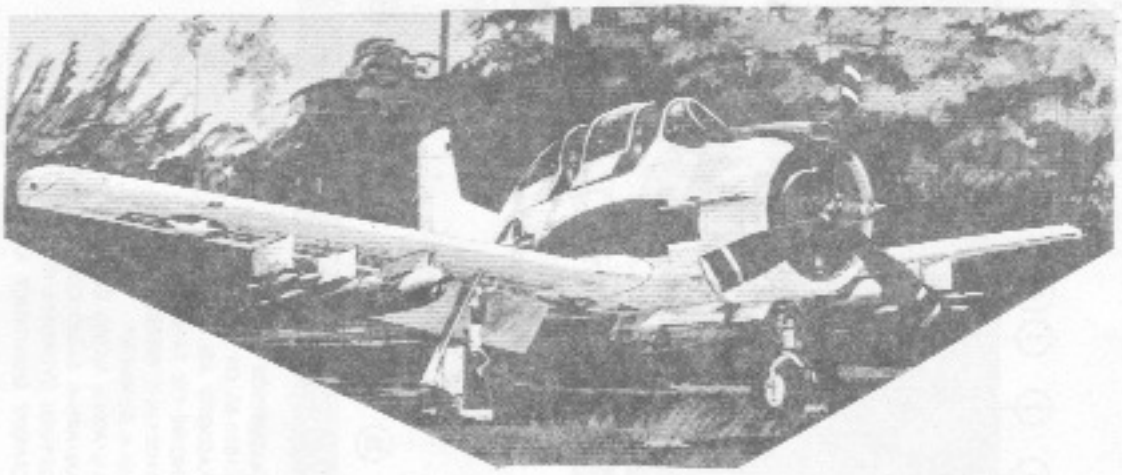
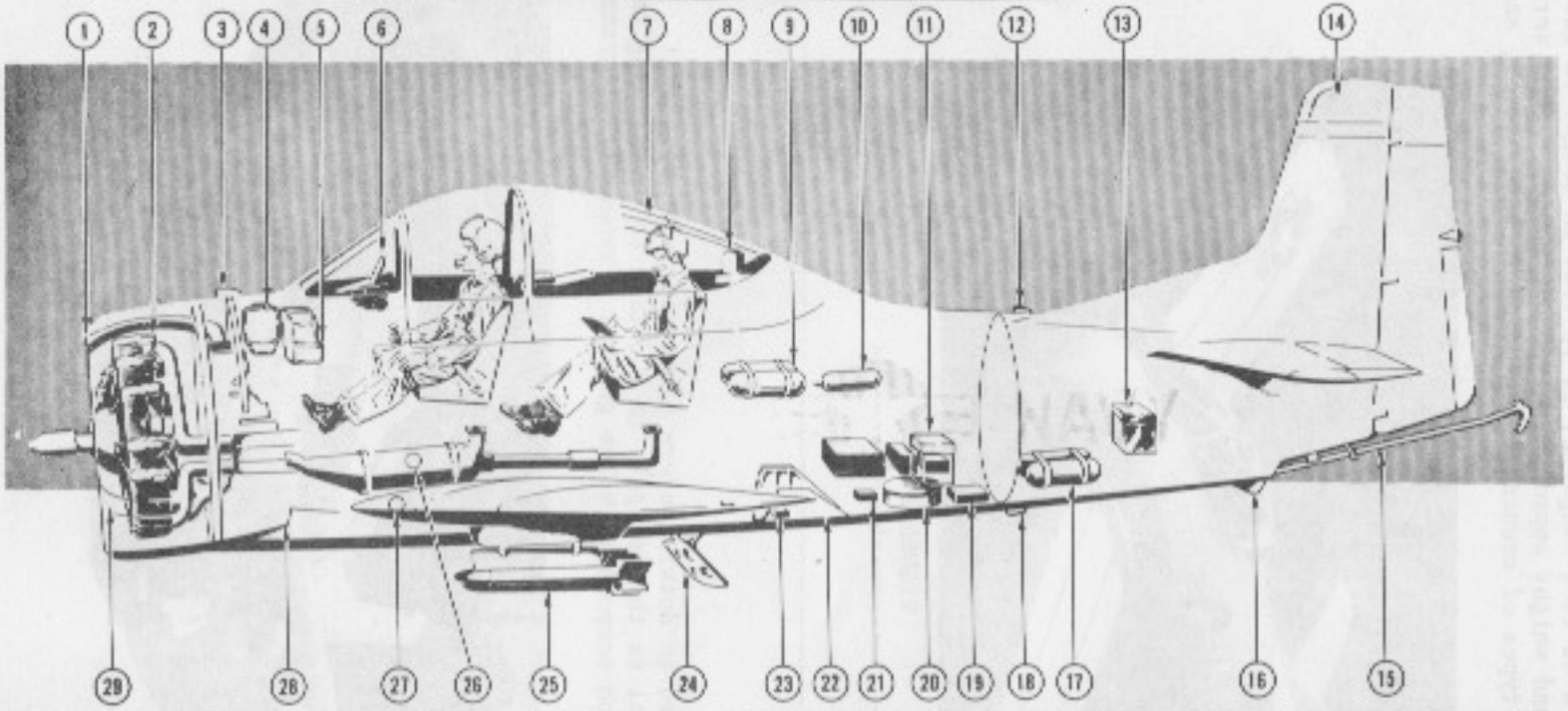


FIGURE 3

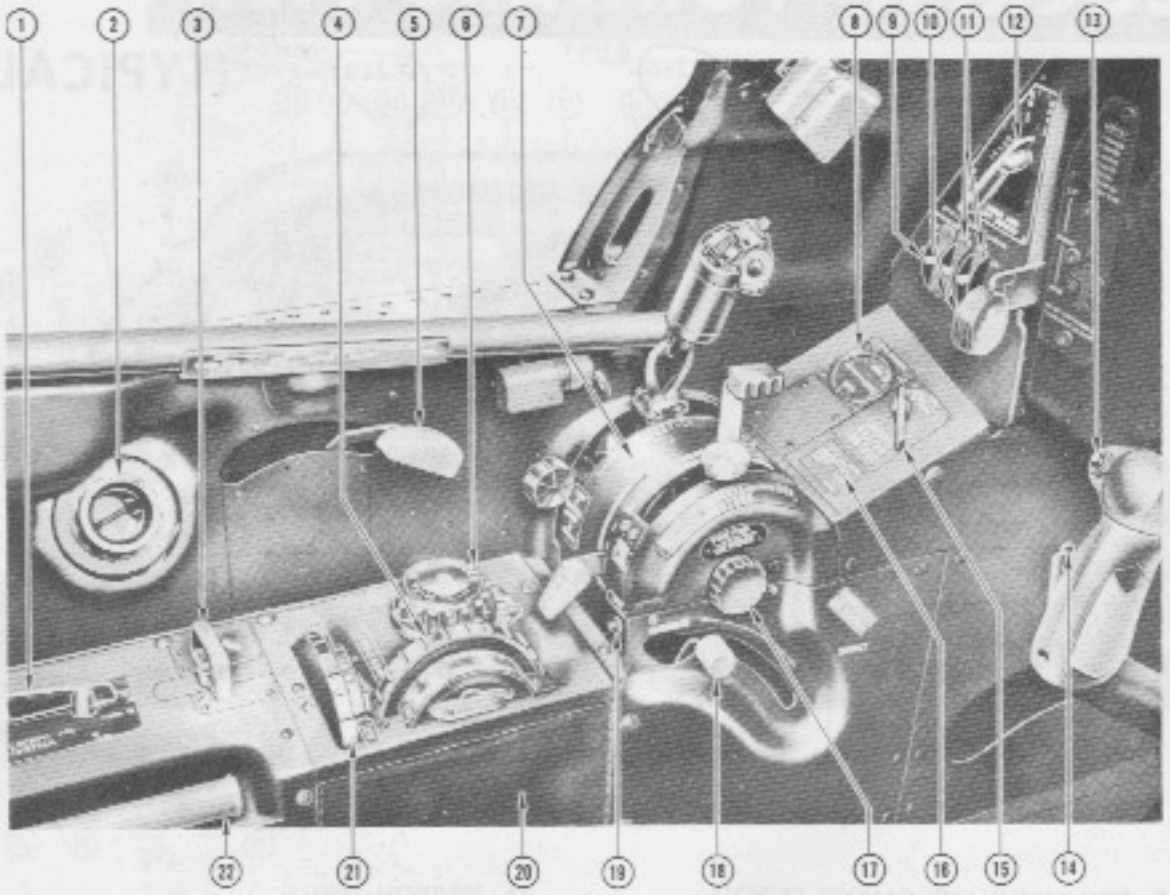
GENERAL ARRANGEMENT



1. CARBURETOR AIR INTAKE
2. R-1820-86 OR -86A ENGINE
3. MAGNETO AIR INTAKE
4. ENGINE OIL TANK
5. HYDRAULIC RESERVOIR
6. MK-8 GUNSIGHT
7. AN/ARN-6 RADIO COMPASS SENSE ANTENNA
8. AN/ARN-6 RADIO COMPASS LOOP ANTENNA
9. OXYGEN CYLINDERS (T-28C)
10. CANOPY EMERGENCY AIR BOTTLE
11. BATTERY (T-28C)
12. UPPER ANTI-COLLISION LIGHT
13. BATTERY (T-28B)
14. UHF COMM/TACAN ANTENNA
15. ARRESTING HOOK (T-28C)
16. TAIL BUMPER
17. OXYGEN CYLINDERS (T-28B)
18. LOWER ANTI-COLLISION LIGHT
19. MARKER BEACON ANTENNA
20. AN/ARA-25 ADF ANTENNA
21. EXTERNAL POWER RECEPTACLE
22. BAGGAGE COMPARTMENT DOOR
23. DATA CASE (BAGGAGE COMPARTMENT)
24. SPEED BRAKE
25. ARMAMENT PACKAGE (2.25-INCH ROCKETS SHOWN)
26. COCKPIT HEATER COMBUSTION AIR OUTLET
27. COCKPIT HEATER COMBUSTION AIR INLET
28. OIL COOLER OUTLET
29. OIL COOLER INTAKE

FIGURE 4

LEFT CONSOLE



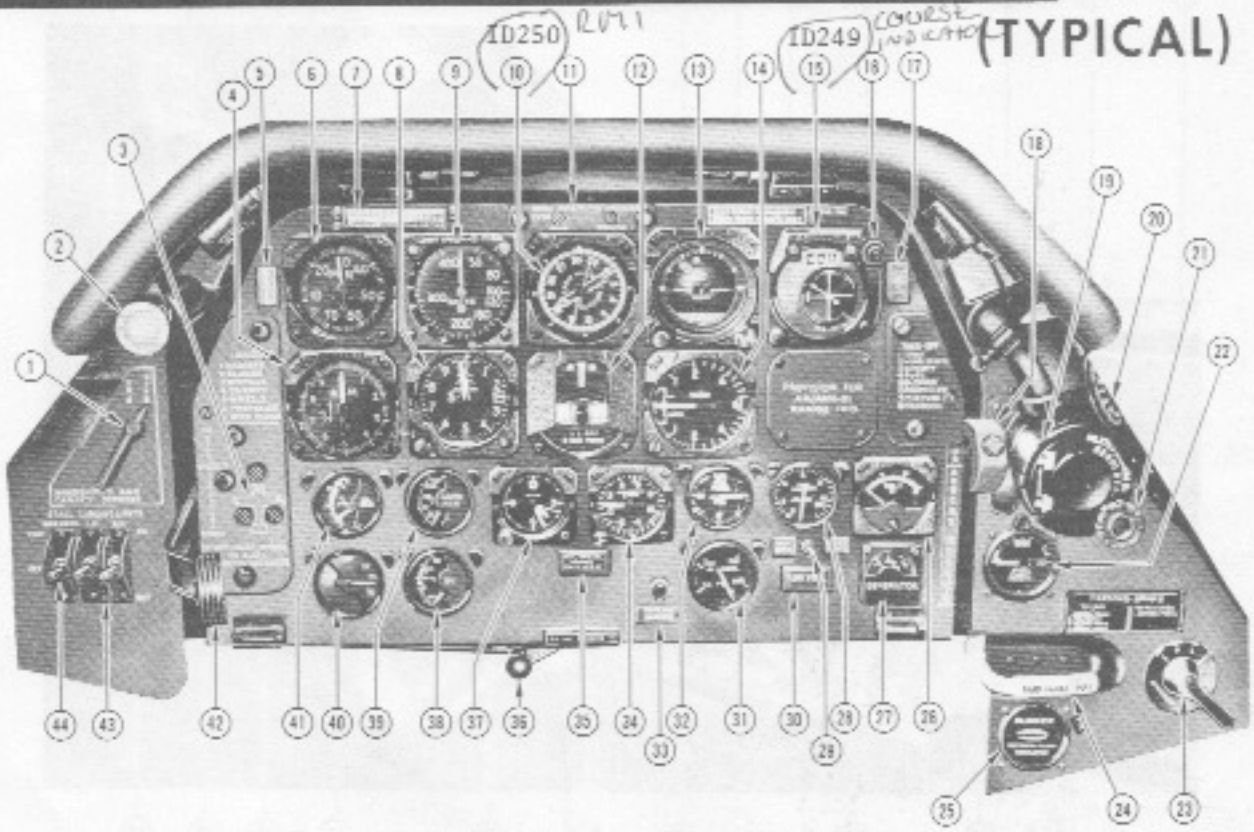
1. COCKPIT AIR CONTROL HANDLE
2. AIR OUTLET
3. FUEL SHUTOFF HANDLE
4. ELEVATOR TRIM WHEEL
5. CANOPY CONTROL HANDLE
6. RUDDER TRIM WHEEL
7. THROTTLE QUADRANT
8. HYDRAULIC SYSTEM PRESSURE GAGE
9. STALL WARNING TEST SWITCH (T-28C)
10. LANDING GEAR HANDLE
11. LANDING LIGHT SWITCHES
12. WINDSHIELD AND CANOPY DEFROST CONTROL HANDLE ◀
13. BOMB RELEASE BUTTON ◀
14. ROCKET FIRING BUTTON ◀
15. COCKPIT HEATER CONTROL HANDLE ◀
16. COWL AND OIL COOLER FLAP SWITCH
17. FRICTION LOCK KNOB ◀
18. CARBURETOR AIR CONTROL
19. HORN SILENCER BUTTON ISOME AIR
20. FLIGHT REPORT HOLDER
21. AILERON TRIM WHEEL
22. HYDRAULIC HAND-PUMP ◀

◀ FRONT COCKPIT ONLY

T-28B-1

FIGURE 5

COCKPIT - FORWARD VIEW (TYPICAL)



1. WINDSHIELD AND CANOPY DEFROST CONTROL HANDLE ◀
2. CANOPY EMERGENCY STOP BUTTON
3. LANDING GEAR POSITION INDICATORS
4. TACHOMETER
5. LANDING GEAR WARNING LIGHT (ASC 63)
6. MANIFOLD PRESSURE INDICATOR
7. AIRSPEED CORRECTION CARD
8. ALTIMETER
9. AIRSPEED INDICATOR
10. RADIO MAGNETIC INDICATOR ID250
11. COMPASS ANNUNCIATOR
12. TURN-AND-BANK INDICATOR
13. GYRO HORIZON INDICATOR
14. VERTICAL SPEED INDICATOR
15. COURSE INDICATOR ID249
16. MARKER BEACON LIGHT
17. COURSE SETTING CHANGE LIGHT
18. ARRESTING HOOK HANDLE (T-28C)
19. OXYGEN REGULATOR
20. FREE AIR TEMPERATURE INDICATOR ◀
21. OXYGEN REGULATOR EMERGENCY VALVE
22. OXYGEN PRESSURE INDICATOR
23. IGNITION SWITCH
24. PARKING BRAKE HANDLE ◀
25. OXYGEN FLOW INDICATOR
26. GENERATOR VOLTMETER
27. GENERATOR LOAD INDICATOR
28. FUEL QUANTITY INDICATOR
29. FUEL QUANTITY INDICATOR TEST SWITCH
30. FUEL LOW-LEVEL WARNING LIGHT
31. OIL PRESSURE INDICATOR
32. FUEL PRESSURE INDICATOR
33. SUMP PLUG WARNING LIGHT
34. ACCELEROMETER
35. FLIGHT INSTRUMENT POWER FAILURE WARNING LIGHT
36. RUDDER PEDAL RELEASE LEVER
37. CLOCK
38. OIL TEMPERATURE INDICATOR
39. CARBURETOR AIR TEMPERATURE INDICATOR
40. WING FLAP POSITION INDICATOR
41. CYLINDER HEAD TEMPERATURE INDICATOR
42. LANDING GEAR HANDLE
43. LANDING LIGHT SWITCHES
44. STALL WARNING TEST SWITCH (T-28C)

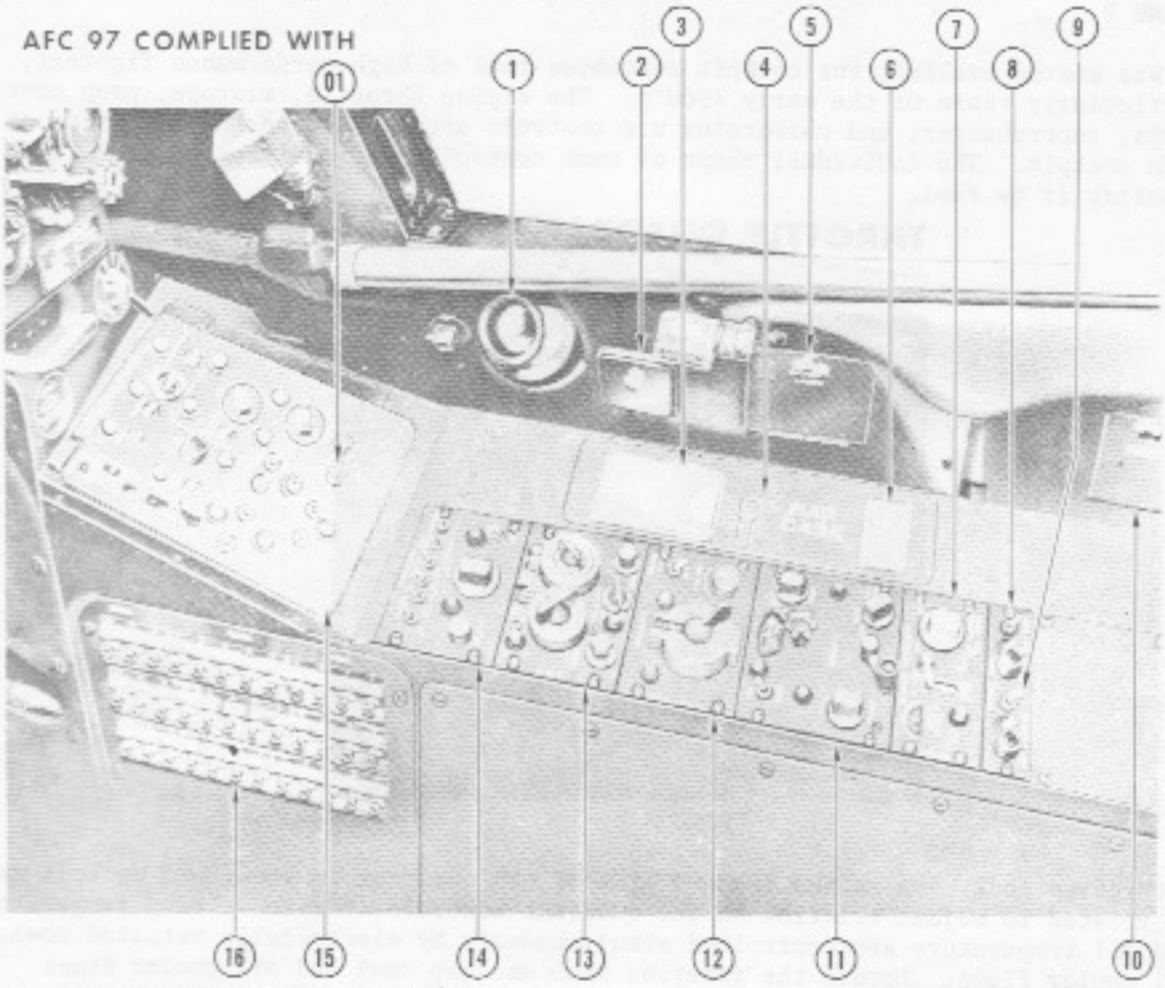
◀ FRONT COCKPIT ONLY

T-28B-1-00-20E

FIGURE 6

RIGHT CONSOLE

AFC 97 COMPLIED WITH



01. FUEL BOOST PUMP TEST SWITCH *◀
1. AIR OUTLET
2. ASH TRAY
3. CHANNELIZATION LOG
4. MAP CASE ◀
5. SPARE LAMPS ◀
6. COMPASS CORRECTION CARD
7. GYROCOMPASS CONTROL PANEL
8. NAV AND COMPASS CONTROL TRANSFER PANEL
9. UHF COMMAND RADIO CONTROL SHIFT SWITCH
10. SPARE FUSES ◀
11. RADIO COMPASS CONTROL PANEL
12. OMNIDIRECTIONAL RECEIVER OR TACAN CONTROL PANEL
13. UHF RADIO CONTROL PANEL
14. INTERCOM CONTROL PANEL
15. ELECTRICAL SWITCH PANEL
16. CIRCUIT BREAKER PANEL ◀

◀ FRONT COCKPIT ONLY
* AIRCRAFT HAVING AFC 105 COMPLIED WITH

FIGURE 7

No response required.

FRAME 7

As was stated earlier, the cockpit resembles that of high-performance fighters, particularly those of the early 1960's. The engine throttle, mixture, prop control, flaps, supercharger, and carburetor air controls are located on the left side of each cockpit. The individual shape of each control knob permits the pilot to identify it by feel.

THROTTLE QUADRANT

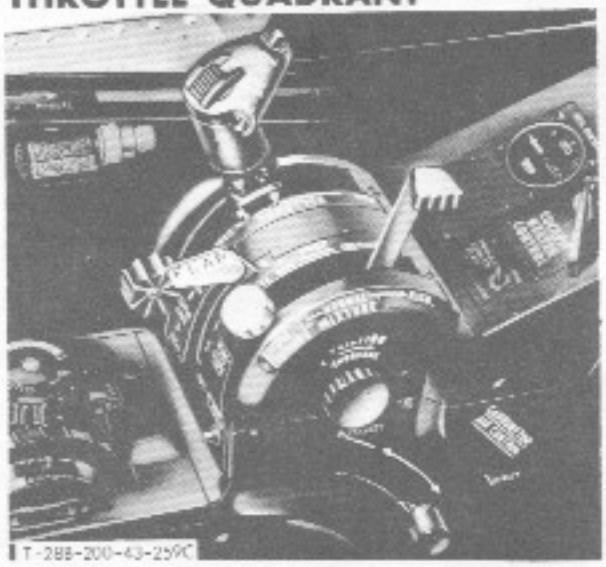


FIGURE 8

A friction lock knob on the inboard side of the quadrant in the front cockpit can be rotated to adjust friction on the quadrant controls. Cylinder head temperature and oil temperature are controlled simultaneously by electrically actuated cowl and oil cooler flaps. Locate the friction knob and the cowl and oil cooler flaps switch in the above figure.

Beginning with the inner control and going outward, list the handles in the order on the throttle quadrant._____

Mixture ... Prop Control ... Flaps ... Throttle ... Supercharger Control

FRAME 8

The throttle handle is one of the few multirole controls in the airplane. It is provided with a takeoff stop in the quadrant so the pilot can feel when the throttle has advanced to the maximum power, or takeoff position (at sea level). Exceeding this stop will result in an overboost condition which usually results in some damage to the engine. This condition will be covered in more detail in later units in engineering.

Exceeding the sea-level stop in the T-28 will result in an _____.

overboost

FRAME 9

Located on the throttle handle are the speed brake switch, ICS button (CALL), and the UHF transmit button (MIKE) which is on the lower inboard side of the grip portion of the handle. The control surface lock is stowed in the front cockpit deck. When engaged it locks all the flight control surfaces in the neutral position. It also locks the throttle in the idle (closed) position. This prevents a takeoff with the controls locked.

List the items located on the throttle handle, and the functions of the control surface lock _____.

Speed brake switch ... ICS button (CALL) ... UHF transmit button (MIKE) ... Functions of control surface lock: (1) locks all control surfaces (2) locks the throttle in the idle (closed) position.

FRAME 10

The small round handle, located inboard on the quadrant, controls the mixture ratio of fuel and air in the carburetor. The handles, one in each cockpit, have three positions -- RICH, NORMAL, and IDLE CUTOFF. The RICH position is used for all aircraft operations other than normal cruise, including taxi and ground operations, takeoff, climb, descents, landings, and all in-flight emergencies. The NORMAL position is used for all normal cruise operations. The mixture stays in RICH during acrobatic flight. The IDLE CUTOFF position shuts off fuel flow at the carburetor to stop the engine.

State the positions for the mixture, and the conditions under which each position will be used. _____.

IDLE CUTOFF - Engine stopped ... NORMAL - Cruise other than acrobatic ... RICH - 1. all ground operations 2. takeoff and landing 3. descents and climbs 4. acrobatics 5. all in-flight emergencies.

FRAME 11

The supercharger control handle is located below and slightly outboard of the throttle. The operating speed ratio of the two-speed supercharger is selected by the position of the supercharger control handle, again one in each cockpit. When the handle is at the LOW (up) position, the supercharger is set at low blower; when the handle is at the HIGH (down) position, the supercharger is set at high blower. The shift from low to high blower is normally done at 12,500 feet during the climb in the instrument training phase. Procedures for this shift will be covered in later flight support units.

No response required.

FRAME 12

A standard magneto ignition switch is located on the right instrument subpanel in each cockpit. Switch positions are BOTH, L, R, and OFF. The L and R positions are provided to individually check engine operation on the left or right ignition system. In the BOTH position, both magnetos are firing simultaneously, to the respective cylinders.

Locate the magneto switch on the forward instrument panel. In the R position, only the _____ magneto is firing.

right

FRAME 13

Located just below and aft of the ignition switch is the electrical control panel. Included on this panel are the d.c. and a.c. power control switches, starter, primer, electrical control switch, and the various light switches for both external and internal lighting. Study this panel in detail before proceeding to the next frame.

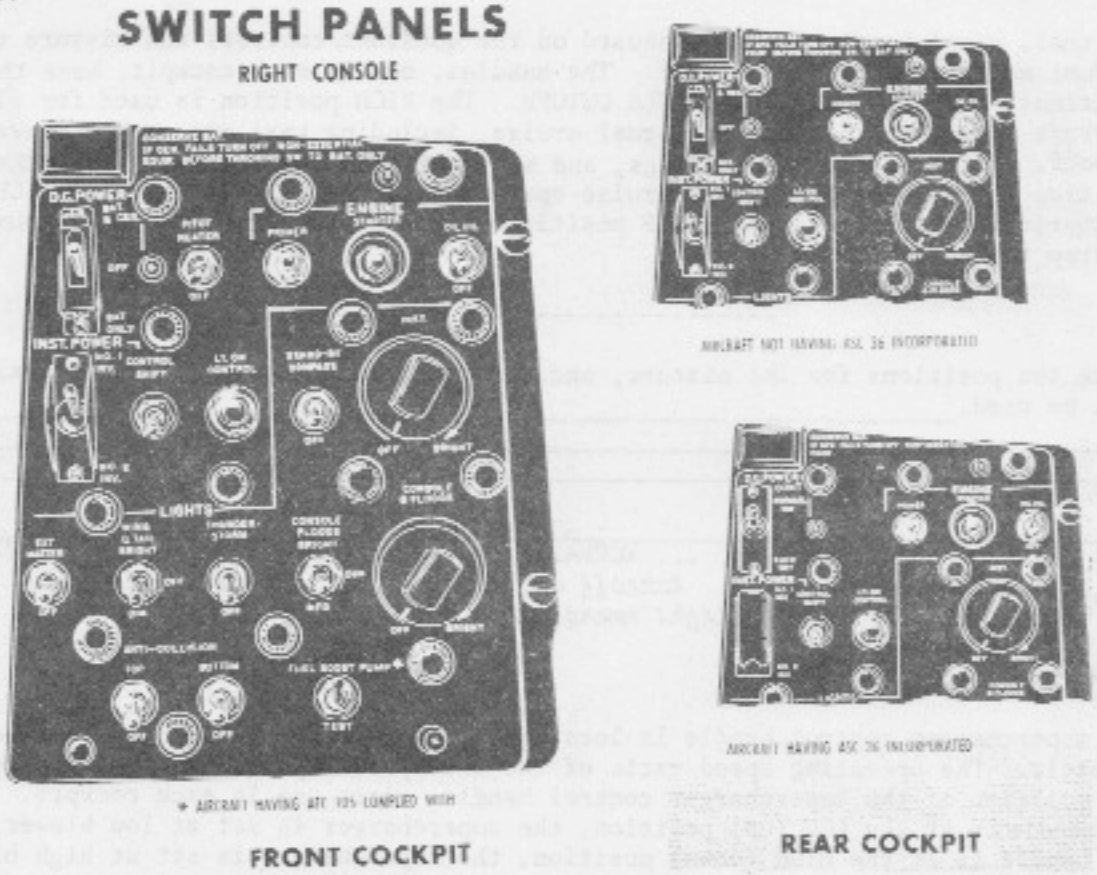


FIGURE 9

No response required.

FRAME 14

A direct-cranking electric starter is controlled by a guarded push button on the electrical console in each cockpit. Depressing this button engages the starter. Adjacent to the starter is the primer button. When the primer button is depressed, the primer is actuated and injects unmetered fuel into the engine supercharger section. Both the starter and the primer are operated by d.c. power from the primary bus. During start the only source of fuel to the engine should be the primer.

The starter and primer buttons are located on the _____ console and receive d.c. power from the _____ bus.

---

electrical ... primary

FRAME 15

The electrical control shift switch, also located on the electrical console, provides the pilot with positive control of a number of aircraft components. Actuation of this switch to the CONTROL SHIFT position can transfer control of the battery and generator, inverters, starter, cowl and oil cooler flaps, speed brake, and all external lights from one cockpit to the other. The pilot that has control will have a light adjacent to the control switch. A variation of this control shift function will be discussed in unit 3. This is one more item to be considered when assuming control of the aircraft from your flight instructor. If you do not have electrical control, you cannot actuate any of the above items from your cockpit.

Name the six items affected by the control shift switch. _____
_____.

Cowl flaps, speed brake, battery and generator, inverters, external lights, starter

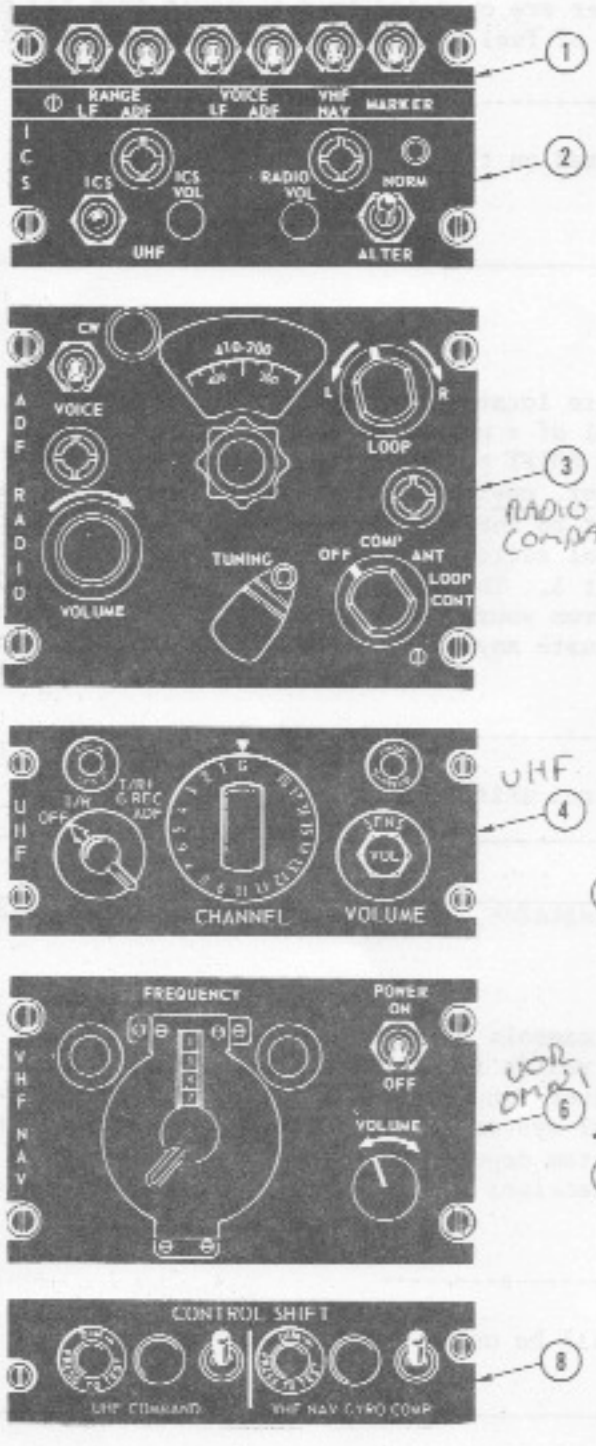
FRAME 16

Located directly aft of the electrical console is the radio console and the associated controls for the respective radios in the airplane. The typical T-28 is equipped with an ARC-27 UHF transceiver and the standard intercockpit communication system. The primary navigational system is either the ARN-14 omninavigation or the ARN-21 TACAN navigation system depending upon the configuration of the T-28. The ARN-6 low/medium frequency receiver may be installed for backup navigational purposes.

When communicating on the radio, you will be using the _____.

ARC-27

COMMUNICATIONS AND NAVIGATION CONTROLS



1. INTERCOM MIXER SWITCHES
2. INTERCOM CONTROL PANEL
3. RADIO COMPASS CONTROL PANEL
4. UHF RADIO CONTROL PANEL
5. UHF RADIO CONTROL PANEL (AFC 97 INCORPORATED)
6. VHF NAV CONTROL PANEL (TACAN NOT INSTALLED)
7. TACAN CONTROL PANEL
8. UHF/NAV-GYRO CONTROL SHIFT PANEL

FIGURE 10

FRAME 17

Beginning with the front panel, the toggle (mixer) switches in front of the ICS control panel serve as radio monitoring switches and have no control over the respective radios. ICS and radio volume controls are also located on this panel. An alternate means of transmitting both ICS and UHF communications is provided by the NORM/ALTER and the ICS/UHF switches. This permits the pilot to transmit by bypassing the throttle transmit buttons.

If you are unable to transmit on the conventional throttle buttons, the_____/_____and the_____/_____switches may be used.

NORM/ALTER ... ICS/UHF

FRAME 18

Before any radio can be tuned, the operating pilot must have control of that particular radio. This can be accomplished by actuating the two control shift switches at the back of the panel. Associated with the switches are control lights, usually blue or green in color. If you have a light in the UHF COMMAND and the VHF NAV-GYRO COMP, you will be able to tune the ARC-27, ARN-14, or ARN-21 (whichever is installed) as well as align the radio magnetic compass system.

It is essential to have_____of the radios before any tuning or changing of frequency can be accomplished.

---

control

FRAME 19

The panel labeled ADF RADIO is the AN/ARN-6 low/medium frequency navigation receiver. This is one of the two radios that utilize the #1 needle on the RMI. This radio will receive any signal between 100 and 1750 kHz. When you have control of the ARN-6, all tuning is done with the control switch in the ANT (antenna) position and with the #2 and #4 mixer switches forward for monitoring the signal of the desired station. When a bearing to the station is desired, place the control switch from the ANT to the COMP (compass) position once a good signal is identified. The #1 needle will then point automatically to the transmitting station.

In order to get bearing information from the ARN-6, the control switch must be in the_____position.

COMP (compass)

FRAME 20

Panel 4, figure 10, is the control panel for the AN/ARC-27 command transceiver. This is the only transceiver capability the T-28 has, and is used for all communications during ground and flight operations. It is controlled by a mode select switch labeled OFF, T/R, T/R + G, and ADF. Located in the front cockpit, panel 5, figure 10, is a 20-channel(preset) selector and a manual tuning frequency selector which is capable of setting additional frequencies other than those that are preset. When the mode select switch is moved to the ADF position, the #1 needle will point to the transmitting facility as selected on the channel selector. The mode select position, T/R + G (transmit/receive + guard/receive), is normally used in flight.

Understand the name and purpose of each position of the UHF mode select switch.

_____

No response required.

FRAME 21

The T-28's primary navigation system is either the AN/ARN-14 omni or the AN/ARN-21 TACAN, panels 6 and 7, figure 10. These are tuned to known frequencies for navigational facilities, and the #2 needle indicates the magnetic bearing to the station when a valid signal is received. At NAS Whiting, the omni frequency is 113.0 and the TACAN channel is channel 70. The three-letter ID for both will be NSE in code.

What are the frequencies for NAS Whiting omni and TACAN? _____

_____

113.0 omni ... channel 70 TACAN

Other items in the cockpit will be covered in detail in the respective units as the course in T-28 engineering progresses.

The remainder of unit 1 will introduce the major aircraft systems incorporated in the T-28.

FUEL SYSTEM

FRAME 22

The fuel system in the T-28 is entirely automatic after being put into operation. The total usable fuel carried in the T-28 is 177 U.S. gallons or 1062 pounds. The system is provided with two interconnected fuel cells in each wing which are gravity fed into a sump pump tank in the right wheel well. From the sump tank and its boost pump, the fuel is then sent through the fuel shutoff valve, strainer, engine-driven fuel pump, and into the carburetor.

After the fuel leaves the sump tank, state the components through which the fuel flows to the carburetor. _____.

_____

Fuel shutoff valve ... strainer ... engine-driven fuel pump

FRAME 23

The fuel system is activated by the fuel shutoff handle in either cockpit, located on the left console. When d.c. power is applied and the fuel shutoff handle is turned on, the fuel boost pump is energized and the fuel shutoff valve is opened. The quantity indicator and fuel warning system are powered by the primary bus. The quantity indicator is graduated in 40-pound increments, and the low-level fuel warning light will illuminate anytime the fuel quantity indicator reads 200 pounds or less.

With d.c. power applied and the fuel shutoff handle turned to the ON position, state the two things that occur._____

_____.

The fuel boost pump is turned on ... the fuel shutoff valve is opened.

ELECTRICAL SYSTEM

FRAME 24

The electrical system in the T-28 utilizes both a.c. and d.c. power and the associated distribution points (buses). Normal in-flight d.c. power is provided by a 300-ampere, 30-volt generator. A 24-volt, 36-ampere battery provides in-flight emergency d.c. power. External power units provide d.c. power for ground operations. All these inputs go to the primary bus from which the system voltage on the voltmeter is read and all other electrical distribution takes place. System voltage normally reads 27.7 ±.5 volts.

With a generator failure, the system voltage read on the voltmeter will be approximately_____volts.

24 volts (battery voltage)

FRAME 25

The battery bus provides power to the electrical control shift relay, a light located in the baggage compartment, and a light located in the nose wheel bay. This bus is energized anytime the battery is installed in the aircraft.

No response required.

FRAME 26

The primary (controlling) bus may be energized by external power. The battery powers the primary bus when the d.c. power switch is in either BAT/GEN or BAT ONLY position. The secondary and monitored buses are energized through the primary bus by generator or external power. The secondary bus can also be energized by the battery when the d.c. power switch is in the BAT ONLY position or when the landing gear is down and the d.c. power switch is in the BAT/GEN position.

The controlling bus in the electrical system is the_____bus, which receives its power from the_____,_____, or_____ _____.

primary ... battery, generator ... external power

FRAME 27

Power for the a.c. system is supplied by two inverters -- a 750-volt-ampere inverter powered from the monitored bus and the 250-volt-ampere inverter powered from the primary bus. The a.c. power in the T-28 is used to supply power for the attitude gyro, radio magnetic indicator, and the heading pointer of the ID-249. Variations and features of this system will be covered in the electrical distribution unit. Power to the a.c. bus is controlled by an a.c. instrument power switch on the electrical panel in each cockpit.

The 750-volt-ampere inverter is powered from the_____bus while the 250-volt-ampere inverter is powered from the_____bus.

monitored ... primary

HYDRAULIC SYSTEM

FRAME 28

Hydraulic pressure is used to operate the landing gear, wing flaps, canopy, speed brake, and in the T-28C aircraft, to retract the arresting hook. A variable-displacement, engine-driven pump supplies hydraulic pressure for the normal operation of the hydraulic components. A hydraulic hand pump is in the front cockpit to provide pressurizing capability should the engine-driven pump fail. Fluid from the main hydraulic reservoir is also supplied to the wheel brake system.

If the engine-driven pump fails, the_____ _____can still be used to provide pressure to the hydraulic system.

hand pump

FRAME 29

The hydraulic system may be considered a pressure-demand type system. Normally in flight, the hydraulic pressure is 0 to 100 p.s.i. When a component is actuated, such as dropping the gear, the hydraulic system pressurizes at 1250 to 1650 p.s.i. and remains pressurized until that component is returned to the retracted or closed position. The hydraulic pressure gauge is located on the left console, forward of the throttle quadrant.

When the flaps are down and the gear is up, the hydraulic pressure is_____to _____p.s.i.

1250 ... 1650

LUBRICATION AND PROPELLER SYSTEMS

FRAME 30

The propeller control and engine lubrication systems in the T-28 use engine oil (Mil-L-22851, Type II). The capacity of the oil system is 8.8 gallons and the reservoir is located in front of the canopy. The filler cap and dip stick are located under an inspection plate on the left side of the fuselage. The oil system is considered a constant-pressure, dry-sump system, and both pressure and splash-and-spray methods of lubrication are used in the engine.

The T-28 oil capacity is_____gallons, which is measured by means of a_____ _____.

8.8 ... dip stick

CONTROL SURFACES AND LANDING GEAR

FRAME 31

The primary control surfaces (elevator, ailerons, and rudder) are operated from either cockpit by interconnected stick and rudder pedals. No hydraulic boost control system is provided. Cable-operated trim tabs on all control surfaces, except the right aileron tab, are manually positioned from trim tab control wheels located on the left console.

No response required.

FRAME 32

Hydraulically operated, semislotted wing flaps are mounted on the trailing edge of each wing and are controlled by a lever on the throttle quadrants. A single hydraulically operated, perforated speed brake, mounted on the bottom of the fuselage, may be extended at any speed by the switch on the top of the throttle. The flaps and speed brake may be actuated from either cockpit.

The trim tabs are cable operated while the speed brake is electrically actuated, _____ operated.

---

hydraulically

FRAME 33

The retractable tricycle landing gear is hydraulically operated, actuated from either cockpit. The main gear retracts inboard into the wing and fuselage; the nose gear retracts aft into the fuselage. Mechanically operated fairing doors cover the wheels in the retracted position. All fairing doors remain open when the gear is down. The full-swiveling nose wheel is equipped with a shimmy damper and automatic airborne centering. Brakes on the main wheels are used for directional control until the rudder becomes effective.

The landing gear is _____operated. The brakes are used for_____ _____as well as controlling taxi speed.

hydraulically ... directional control

HEATING AND VENTILATION SYSTEM

FRAME 34

Air for cockpit ventilation and heating enters the cockpit from a separate outlet in the oil cooler duct. All air passes through the heater chamber before it gets into the cockpit. For heat, a combustion type heater supplies heat by burning a fuel-air mixture in the heater chamber, and the intake air is heated as it passes through the chamber. Air circulation is controlled by handles on the left console. A separate control is provided for the heater and is in the front cockpit only.

Air ventilation enters the cockpit after it passes through the_____ _____. The heater control is in the_____cockpit only.

heater chamber ... front

LIGHTING SYSTEM

FRAME 35

The lighting system for the aircraft is sufficient for complete night operations. The wing and tail position, landing and taxi, and anticollision lights may be controlled from either cockpit as long as that cockpit has electrical control. The light switches are located on the right forward console, along with the d.c. and a.c. power switches. The rotating anticollision lights are controlled by TOP and BOTTOM anticollision switches on the same panel and are independent of the external master lights switch.

Light switches are located on the_____ _____ _____.

right forward console

FRAME 36

Interior lighting is independently controlled by each cockpit switch group. Individual lighting is provided for each instrument. Console flood and thunderstorm lights also provide lighting for cockpit use. The console flood lights have a variable brilliance feature -- bright, dim, and medium intensity. The thunderstorm lights are white flood lights and are to be used at night when lightning flashes could blind you temporarily.

The instruments are_____lighted, and the thunderstorm lights are to be used when_____is anticipated.

individually ... lightning

UC 09 03 01 01 EL

NAME & RANK _____

CLASS _____ DATE _____ SCORE [ ]

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

11. _____

Reverse Blank