

SUPPLEMENT

AIR CONDITIONING SYSTEM

SECTION 1 GENERAL

The air conditioning system provides a comfortable cabin temperature during ground and flight operations. System controls are located on the control pedestal and consist of two rotary type control knobs. Blower speed is controlled by the upper knob, labeled FAN. The control rotates clockwise from OFF through three positions labeled LOW, MED, and HI, and provides three blower speeds. Temperature is controlled by the lower knob, labeled AIR TEMP. Rotating the control clockwise from OFF to ON will start the compressor. Clockwise rotation from ON to MAX will control cabin temperature by cycling the compressor operation. System electrical protection is provided by a 10-amp circuit breaker on the left side of the switch and control panel. Cooling air is vented to the cabin through two ducts and four fully adjustable outlets above the cabin side windows.

System components (see figure 1) include a belt-driven compressor, two Schrader valves, high pressure switch, condenser, air scoop, receiver/drier, expansion valve, evaporator/blower unit and the necessary controls, plumbing and wiring. The belt-driven compressor is located at the front of the engine on the left side. Two freon lines are connected to the rear of the compressor and contain Schrader valves which are used to service the system. A pressure switch is attached to the Schrader valve in the high pressure line to the condenser and is electrically connected to the compressor and the thermostat-type AIR TEMP switch on the control pedestal. The two freon lines are routed from the engine compartment through a tunnel on the bottom of the fuselage to an airscoop which houses the condenser. One line is connected to the condenser and the other line is routed to the evaporator unit above the aft baggage area. A double-shaft electric motor and two squirrel-cage type blowers on the back of the evaporator unit provide airflow through the evaporator to the cabin outlets. A receiver/drier, which serves as a reservoir for liquid freon, is mounted under the aft baggage area floor. Two freon lines connect the receiver/drier to the condenser and the thermostatic expansion valve. A sight glass on the top of the receiver/drier is covered by a plug button in the aft baggage area floor.

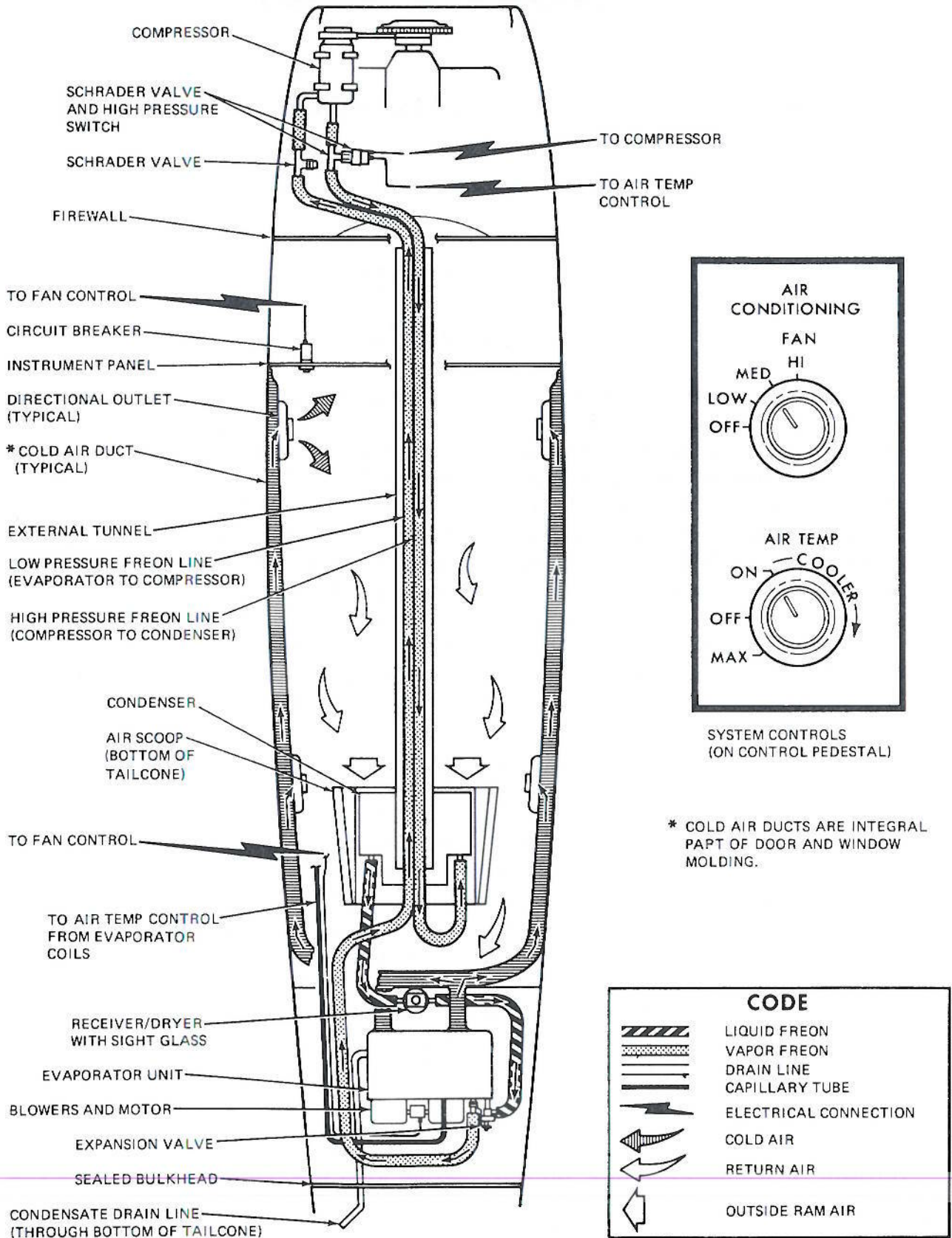


Figure 1. Air Conditioning System

In addition to air conditioner components, the airplane utilizes a special nose cap to provide room for the compressor. Also, an aileron-/rudder interconnect spring system is added to counter the effects of the external condenser scoop and to improve the airplane's stability in flight.

SECTION 2 LIMITATIONS

The air conditioning system must not be operated during takeoff and landing.

The use of flaps for takeoff is not approved at maximum weights above 2300 pounds when the condenser fairing is not installed. With the condenser fairing installed, or at maximum weights of 2300 pounds or less, up to 10° flaps is approved.

The following information must be presented in the form of a placard, located near the engine instrument cluster.

<p>TURN OFF AIR CONDITIONER FOR TAKEOFF AND LANDING</p>

SECTION 3 EMERGENCY PROCEDURES

There is no change to the airplane emergency procedures when the air conditioning system is installed.

SECTION 4 NORMAL PROCEDURES

PREFLIGHT INSPECTION

During the preflight (walk-around) inspection, open both cabin doors to aid in cool-down of the cabin before flight. Air conditioning system components should be inspected as follows:

1. Check compressor drive belt for tightness, and compressor for condition.
2. Check tunnel from firewall to condenser air scoop for damage, looseness and evidence of line leakage.
3. Check condenser air scoop for blockage, condition, and evidence of system leakage.
4. Check that return air openings in top of aft baggage area are clean and not blocked by baggage. Also, check area for evidence of system leakage.
5. Check that condensate drain is not damaged or blocked.

If the inspection should reveal oil streaks or drops of oil in the aft baggage area or on the ground, do not operate the air conditioning system until it has been checked by service personnel.

OPERATION ON GROUND

After preflight inspection and engine start, use the following procedures for best utilization of the system prior to flight.

1. Cabin Doors and Windows -- CLOSED.
2. Cabin Air Control Knob -- PUSHED IN.
3. Wing Root Ventilators -- CLOSED.
4. AIR TEMP Control Knob -- MAX.
5. FAN Control Knob -- HI.
6. After Initial Cooldown -- REPOSITION AIR TEMP and FAN control knobs as required to maintain desired temperature.

NOTE

A high pressure switch in the air conditioning system disengages the compressor clutch and stops system operation in the event the system becomes overheated during periods of idling at low RPM. The system will cycle on and off under these circumstances and is not malfunctioning. If this occurs, head the airplane into the wind and increase engine RPM, if practical.

BEFORE TAKEOFF

1. AIR TEMP Control Knob -- OFF.
2. FAN Control Knob -- AS DESIRED.

TAKEOFF

Because of the effect of the air conditioning system on climb performance, flaps are not approved for takeoff whenever the airplane is

operated at weights above 2300 pounds and the condenser fairing is not installed. When operating with the condenser fairing installed or at maximum weights of 2300 pounds or less up to 10° of flap may be used.

At takeoff weights above 2300 pounds and without the condenser fairing installed, short field takeoffs should be conducted without flaps using a speed of 59 KIAS at the 50-foot obstacle. With the condenser fairing installed or at weights of 2300 pounds or less, the speeds on the Takeoff Distance chart in Section 5 of the basic handbook and a 10° flap setting may be used. All other speeds remain unchanged from those listed in Section 4 of the basic handbook.

OPERATION IN FLIGHT

The inflight operation of the air conditioning system is basically the same as for ground operation. If fast cool down is desired, check that all vents are closed, place the AIR TEMP control in the MAX position, and place the FAN control in the HI position. When cabin temperature has been reduced to the desired level, rotate the AIR TEMP control knob counter-clockwise as required to maintain that temperature and reposition the FAN control knob as desired.

During extended flight in extremely high temperature and humidity, the evaporator coils may frost over. The evaporator unit is equipped with an automatic defrost system which will normally prevent this. However, when the AIR TEMP control is placed in the MAX position, the automatic defrost system will not operate. This problem can be recognized by a continual rise in the temperature of the airflow from the outlets. To correct the problem, move the AIR TEMP control knob approximately one-third of the way toward the OFF position and check that the FAN control knob is in the HI position. This action should allow the automatic defrost system to remove the frost.

NOTE

If the temperature of the air coming from the outlets does not start to cool within a reasonable length of time (depending on the amount of frost), the system may be malfunctioning and should be turned off.

The blower portion of the system may be used any time air circulation (heated or fresh) is desired. This is accomplished by leaving the AIR TEMP control knob in the OFF position, and placing the FAN control knob in the LOW, MED, or HI position as desired.

BEFORE LANDING

1. AIR TEMP Control Knob -- OFF.

2. FAN Control Knob -- AS DESIRED.

AFTER LANDING

The AIR TEMP control knob may be rotated from OFF to a position that will maintain the cabin temperature at a comfortable level while operating on the ground.

SECTION 5 PERFORMANCE

To obtain takeoff performance of the airplane with the air conditioning system installed and wing flaps up, increase both ground roll and total distance over the 50-foot obstacle by 15% over that shown in Section 5 of the basic handbook. When operating at or below 2300 pounds and using 10° flaps, increase the takeoff distance shown in Section 5 of the basic handbook by 5%.

The reduction in climb performance with the air conditioning system installed is 90 FPM with the compressor on and 65 FPM with the compressor off.

Cruise speeds with the air conditioning system installed are 5 knots below those shown in Section 5 of the basic handbook for any particular RPM. Also, an allowance should be made for cruise fuel consumption which is up to 0.5 GPH higher than shown in Section 5 of the basic handbook for any particular RPM.

A condenser air scoop fairing, provided with the system, will change the performance decrements to 2 knots for cruise speed and 25 FPM for rate of climb. The fairing is intended for use during off-season operations. Do not operate the air conditioning system with the fairing installed.

DEMONSTRATED OPERATING TEMPERATURE

Satisfactory engine cooling has been demonstrated for the airplane with this equipment installed with an outside air temperature 23°C above standard. This is not to be considered as an operating limitation. Reference should be made to Section 2 of the basic handbook for engine operating limitations.

SUPPLEMENT

CARBURETOR AIR TEMPERATURE GAGE

SECTION 1 GENERAL

The carburetor air temperature gage provides a means of detecting carburetor icing conditions. The gage is located on the right side of the instrument panel. It is marked in 5° increments from -30°C to +30°C, and has a yellow arc between -15°C and +5°C which indicates the temperature range most conducive to carburetor icing.

SECTION 2 LIMITATIONS

There is no change to the airplane limitations when the carburetor air temperature gage is installed.

SECTION 3 EMERGENCY PROCEDURES

There is no change to the airplane emergency procedures when the carburetor air temperature gage is installed.

SECTION 4 NORMAL PROCEDURES

There is no change to the airplane normal procedures when the carburetor air temperature gage is installed. It is good practice to monitor the gage periodically and keep the needle out of the yellow arc during possible carburetor icing conditions. Refer to Section 4 of the basic handbook for procedures used when operating with carburetor heat applied.

SECTION 5

PERFORMANCE

There is no change to the airplane performance when the carburetor air temperature gage is installed. However, if it is necessary to operate with carburetor heat applied, a small performance loss may be expected at any given power setting due to the warmer induction air temperature.

SUPPLEMENT

CIRCULATION FAN SYSTEM

SECTION 1 GENERAL

The circulation fan system provides cabin ventilation during ground operations, and a better distribution of cabin air to the passengers during flight operations. The system control is located on the control pedestal, and consists of a rotary control knob, labeled CIRCULATION FAN. The control knob rotates clockwise from OFF through three positions labeled LOW, MED, and HI, providing three blower speeds. System electrical protection is provided by a 5-amp circuit breaker, labeled CIR FAN, on the left side of the switch and control panel.

Additional system components (see figure 1) include a circulation fan and motor located above the extended baggage compartment, system ducting, and four fully adjustable outlets above the cabin side windows. The circulation fan and motor includes an electric motor, equipped with an output shaft on each end, attached to squirrel-cage type blowers within blower housings which provide airflow through the ducts to the cabin outlets.

The volume of airflow through the cabin outlets is controlled by the rotary knob on the control pedestal; adjustable louvers on each outlet control the direction of airflow.

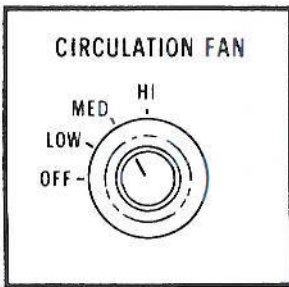
SECTION 2 LIMITATIONS

There is no change to the airplane limitations when the circulation fan system is installed.

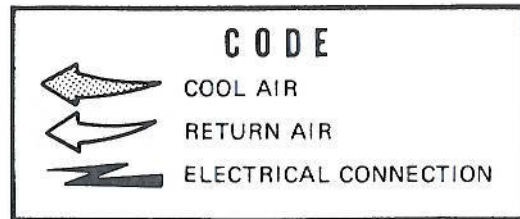
4

CIRCULATION FAN SYSTEM MODEL 172P

PILOT'S OPERATING HANDBOOK SUPPLEMENT



CIRCULATION FAN CONTROL
(ON CONTROL PEDESTAL)



* THESE AIR DUCTS ARE INTEGRAL PART OF DOOR AND WINDOW MOLDING

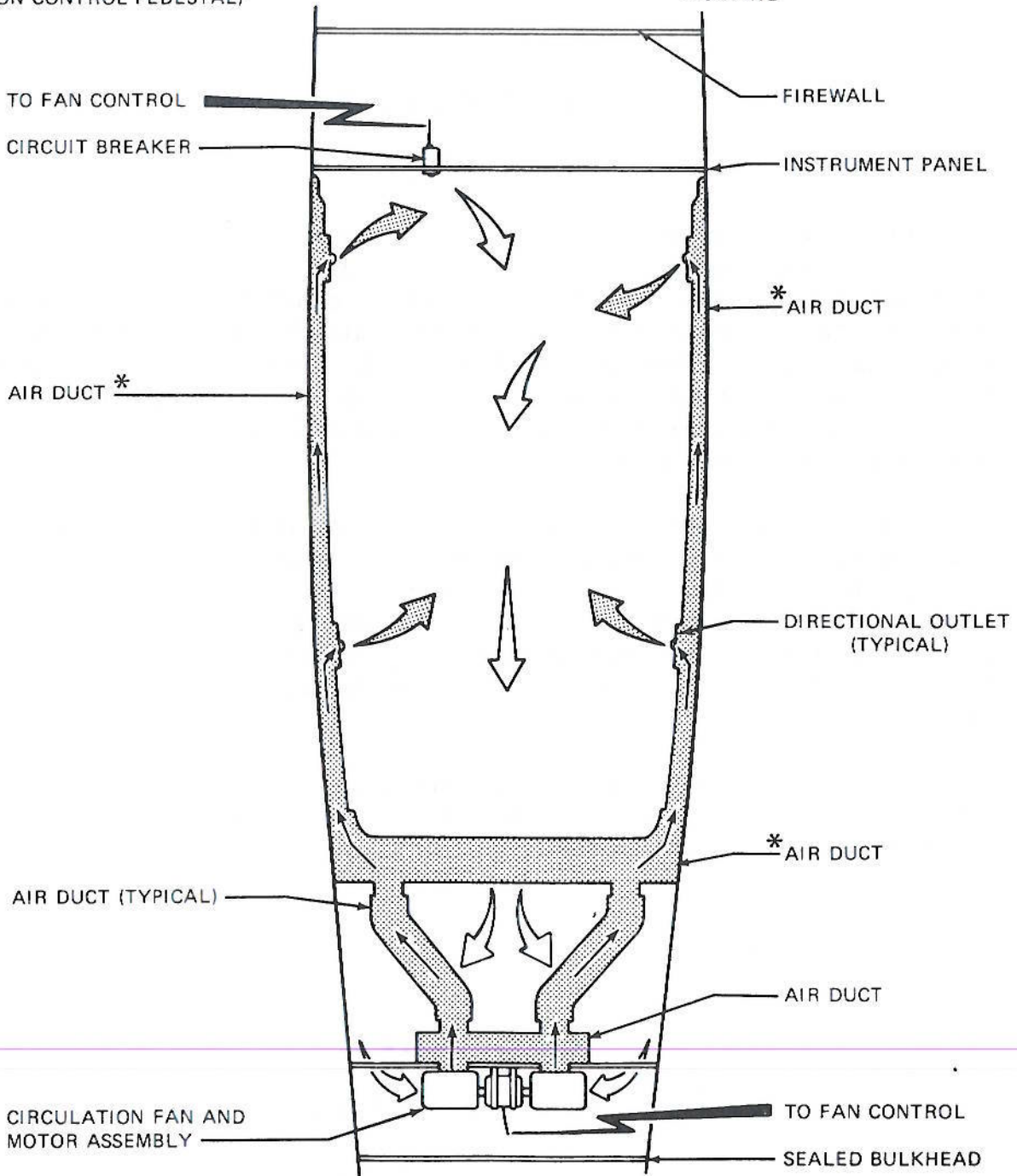


Figure 1. Circulation Fan System

SECTION 3 EMERGENCY PROCEDURES

There is no change to the airplane emergency procedures when the circulation fan system is installed.

SECTION 4 NORMAL PROCEDURES

PREFLIGHT INSPECTION

In hot weather during the preflight (walk-around) inspection, open both cabin doors to aid in cool-down of the cabin before flight.

OPERATION ON GROUND

After preflight inspection and engine start, use the following procedures for best utilization of the system prior to flight.

1. Cabin Window(s) -- OPEN.
2. Cabin Air Control Knob -- PULL OUT.
3. Wing Root Ventilators -- OPEN.
4. CIRCULATION FAN Control Knob -- HI.

BEFORE TAKEOFF

1. Cabin Window(s) -- CLOSED AND LOCKED.

OPERATION IN FLIGHT

The inflight operation of the circulation fan system is basically the same as for ground operation. The cabin air control knob, wing root ventilators, and the circulation fan control knob may be adjusted, as required to provide the desired cabin ventilation.

After landing, the cabin window(s) may be opened while taxiing to the tie-down area or ramp to help ventilate the cabin.

4

**CIRCULATION FAN
SYSTEM
MODEL 172P**

**PILOT'S OPERATING HANDBOOK
SUPPLEMENT**

SECTION 5 PERFORMANCE

There is no change to the airplane performance when the circulation fan system is installed.

SUPPLEMENT

DIGITAL CLOCK

SECTION 1 GENERAL

The Astro Tech LC-2 Quartz Chronometer (see figure 1) is a precision, solid state time keeping device which will display to the pilot the time-of-day, the calendar date, and the elapsed time interval between a series of selected events, such as in-flight check points or legs of a cross-country flight, etc. These three modes of operation function independently and can be alternately selected for viewing on the four digit liquid crystal display (LCD) on the front face of the instrument. Three push button type switches directly below the display control all time keeping functions. These control functions are summarized in figures 2 and 3.

The digital display features an internal light (back light) to ensure good visibility under low cabin lighting conditions or at night. The intensity of the back light is controlled by the RADIO LT rheostat. In addition, the display incorporates a test function (see figure 1) which allows checking that all elements of the display are operating. To activate the test function, press the LH and RH buttons at the same time.

SECTION 2 LIMITATIONS

There is no change to the airplane limitations when the digital clock is installed.

SECTION 3

EMERGENCY PROCEDURES

There is no change to the airplane emergency procedures when the digital clock is installed.

5

DIGITAL CLOCK MODEL 172P

PILOT'S OPERATING HANDBOOK SUPPLEMENT

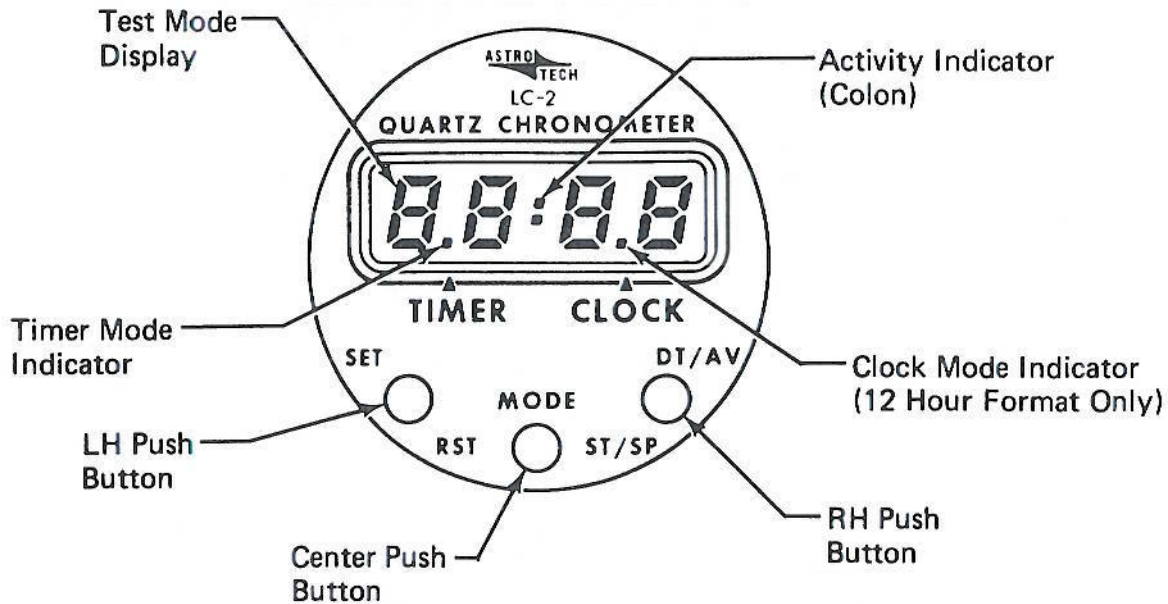


Figure 1. Digital Clock

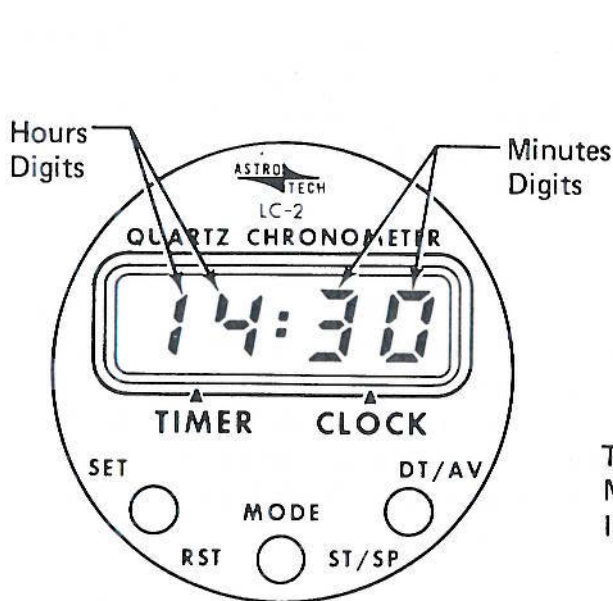
SECTION 4 NORMAL PROCEDURES

CLOCK AND DATE OPERATION

When operating in the clock mode (see figure 2), the display shows the time of day in hours and minutes while the activity indicator (colon) will blink off for one second each ten seconds to indicate proper functioning. If the RH push button is pressed momentarily, while in the clock mode, the calendar date appears numerically on the display with month of year to the left of the colon and day of the month shown to the right of the colon. The display automatically returns to the clock mode after approximately 1.5 seconds. However, if the RH button is pressed continuously longer than approximately two seconds, the display will return from the date to the clock mode with the activity indicator (colon) blinking altered to show continuously or be blanked completely from the display. Should this occur, simply press the RH button again for two seconds or longer, and correct colon blinking will be restored.

NOTE

The clock mode is set at the factory to operate in the 24-hour format. However, 12-hour format operation may be

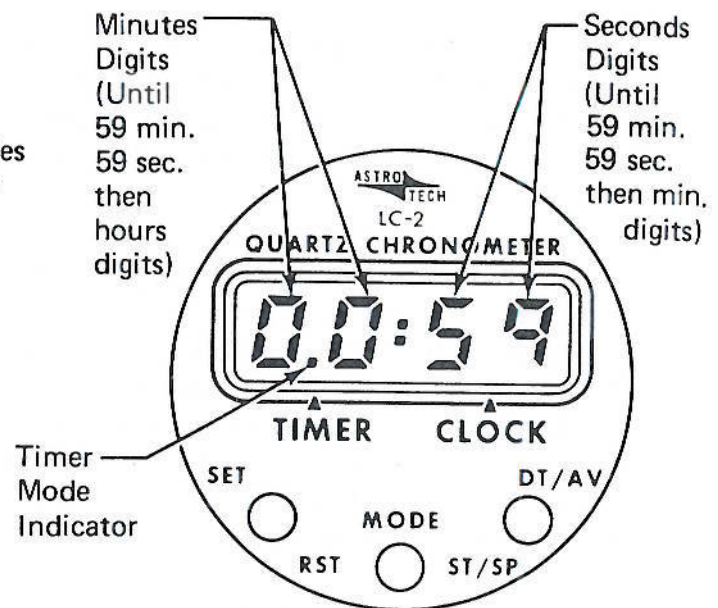


LH Button: Sets date and time of day (when used with RH button).

Center Button: Alternately displays clock or timer status

RH Button: Shows calendar date momentarily; display returns to clock mode after 1.5 seconds.

Figure 2. Clock Mode



LH Button: Resets timer to "zero".

Center Button: Alternately displays clock or timer status

RH Button: Alternately starts and stops timer; timer starts from any previously accumulated total.

Figure 3. Timer Mode

selected by changing the position of an internal slide switch accessible through a small hole on the bottom of the instrument case. Notice that in the 24-hour format, the clock mode indicator does not appear.

SETTING CORRECT DATE AND TIME

The correct date and time are set while in the clock mode using the LH and RH push buttons as follows: press the LH button once to cause the date to appear with the month flashing. Press the RH button to cause the month to advance at one per second (holding button), or one per push until the correct month appears. Push the LH button again to cause the day of month to appear flashing, then advance as before using RH button until correct day of month appears.

Once set correctly, the date advances automatically at midnight each day. February 29 of each leap year is not programmed into the calendar mode, and the date will advance to March 1. This may be corrected the following day by resetting the mode back to March 1.

Pressing the LH button two additional times will cause the time to appear with the hours digits flashing. Using the RH button as before, advance the hour digits to the correct hour as referenced to a known time standard. Another push of the LH button will now cause the minutes digits to flash. Advance the minutes digits to the next whole minute to be reached by the time standard and "hold" the display by pressing the LH button once more. At the exact instant the time standard reaches the value "held" by the display, press the RH button to restart normal clock timing, which will now be synchronized to the time standard.

In some instances, however, it may not be necessary to advance the minutes digits of the clock; for example when changing time zones. In such a case, do not advance the minutes digits while they are flashing. Instead, press the LH button again, and the clock returns to the normal time keeping mode without altering the minutes timing.

TIMER OPERATION

The completely independent 24-hour elapsed timer (see figure 3) is operated as follows: press the center (MODE) push button until the timer mode indicator appears. Reset the display to "zero" by pressing the LH button. Begin timing an event by pressing the RH button. The timer will begin counting in minutes and seconds and the colon (activity indicator) will blink off for 1/10 second each second. When 59 minutes 59 seconds have accumulated, the timer changes to count in hours and minutes up to a maximum of 23 hours, 59 minutes. During the count in hours and minutes, the colon blinks off for one second each ten seconds. To stop timing the event, press the RH button once again and the time shown by the display is "frozen". Successive pushes of the RH button will alternately restart the count from the "held" total or stop the count at a new total. The hold status of the timer can be recognized by lack of colon activity, either continuously on or continuously off. The timer can be reset to "zero" at anytime using the LH button.

SECTION 5

PERFORMANCE

There is no change to the airplane performance when the digital clock is installed.

SUPPLEMENT

GROUND SERVICE PLUG RECEPTACLE

SECTION 1 GENERAL

The ground service plug receptacle permits the use of an external power source for cold weather starting and during lengthy maintenance work on electrical and avionics equipment. The receptacle is located behind a door adjacent to the firewall on the left side of the lower cowl.

NOTE

If no avionics equipment is to be used or worked on, the avionics power switch should be turned off. If maintenance is required on the avionics equipment, it is advisable to utilize a battery cart external power source to prevent damage to the avionics equipment by transient voltage. Do not crank or start the engine with the avionics power switch turned on.

A special fused circuit is included with the ground service plug receptacle which will close the battery contactor when external power is applied with the master switch turned on. This circuit is intended as a servicing aid when battery power is too low to close the contactor, and should not be used to avoid performing proper maintenance procedures on a low battery.

NOTE

Use of the ground service plug receptacle for starting an airplane with a "dead" battery or charging a "dead" battery in the airplane is not recommended. The battery should be removed from the airplane and serviced in accordance with Service Manual procedures. Failure to observe this precaution could result in loss of electrical power during flight.

The ground service plug receptacle circuit incorporates a polarity reversal protection. Power from the external power source will flow only if the ground service plug is correctly connected to the airplane. If the plug is accidentally connected backwards, no power will flow to the electrical system, thereby preventing any damage to electrical equipment.

The following check should be made after engine start and removal of the external power source, if there is any question as to the condition of the battery.

1. Master Switch -- OFF.
2. Taxi and Landing Light Switches -- ON.
3. Engine RPM -- REDUCE to idle.
4. Master Switch -- ON (with taxi and landing lights turned on),
5. Engine RPM -- INCREASE to approximately 1500 RPM.
6. Ammeter and Low-Voltage Warning Light -- CHECK.

NOTE

If the ammeter does not show a charge or the low-voltage warning light does not go out, the battery should be removed from the airplane and properly serviced prior to flight.

SECTION 5 PERFORMANCE

There is no change to the airplane performance when the ground service plug receptacle is installed.

SUPPLEMENT

WINTERIZATION KIT

SECTION 1 GENERAL

The winterization kit consists of two cover plates (with placards) which attach to the air intakes in the cowling nose cap, a restrictive cover plate for the aft side of the oil cooler, insulation for the engine crankcase breather line, and a placard to be installed on the instrument panel. This equipment should be installed for operations in temperatures consistently below 20°F (-7°C). Once installed, the crankcase breather insulation is approved for permanent use, regardless of temperature.

SECTION 2 LIMITATIONS

The following information must be presented in the form of placards when the airplane is equipped with a winterization kit.

1. On each nose cap cover plate:

REMOVE WHEN
OAT EXCEEDS 20°F

2. On right hand nose cap cover plate:

REMOVE OIL COOLER COVER PLATE
FROM AFT SIDE OF OIL COOLER
WHEN OAT EXCEEDS 20°F

3. On right side of instrument panel:

WINTERIZATION KIT (RIGHT AND LEFT NOSE
CAP COVER AND OIL COOLER COVER PLATE)
MUST BE REMOVED WHEN OUTSIDE AIR
TEMPERATURE IS ABOVE 20°F.

SECTION 3 EMERGENCY PROCEDURES

There is no change to the airplane emergency procedures when the winterization kit is installed.

SECTION 4 NORMAL PROCEDURES

There is no change to the airplane normal procedures when the winterization kit is installed.

SECTION 5 PERFORMANCE

There is no change to the airplane performance when the winterization kit is installed.

SUPPLEMENT

AUDIO CONTROL PANELS

SECTION 1

GENERAL

Two types of audio control panels (see figure 1) are available for this airplane, depending upon how many transmitters are included. The operational features of both audio control panels are similar and are discussed in the following paragraphs.

TRANSMITTER SELECTOR SWITCH

When the avionics package includes a maximum of two transmitters, a two-position toggle-type switch, labeled XMTR, is provided to switch the microphone to the transmitter the pilot desires to use. If the airplane avionics package includes a third transmitter, the transmitter selector switch is a three-position rotary-type switch, labeled XMTR SEL. To select a transmitter, place the transmitter selector switch in the position number corresponding to the desired transmitter.

The action of selecting a particular transmitter using the transmitter selector switch simultaneously selects the audio amplifier associated with that transmitter to provide speaker audio. For example, if the number one transmitter is selected, the audio amplifier in the number one NAV/COM is also selected and is used for ALL speaker audio. Headset audio is not affected by audio amplifier operation.

AUDIO SELECTOR SWITCHES

Both audio control panels (see figure 1) incorporate three-position toggle-type audio selector switches for individual control of the audio systems installed in the airplane. These switches allow receiver audio to be directed to the airplane speaker or to a headset, and heard singly or in combination with other receivers. To hear a particular receiver on the airplane speaker, place that receiver's audio selector switch in the up (SPEAKER) position. To listen to a receiver over a headset, place that receiver's audio selector switch in the down (PHONE) position. The center (OFF) position turns off all audio from the associated receiver.

NOTE

Volume level is adjusted using the individual receiver volume controls on each radio.

A special feature of the audio control panel used when one or two transmitters are installed is separate control of NAV and COM audio from the NAV/COM radios. With this installation, the audio selector switches labeled NAV, 1 and 2 select audio from the navigation receivers of the NAV/COM radios only. Communication receiver audio is selected by the switches labeled COM, AUTO and BOTH. Description and operation of these switches is described in figure 1.

When the audio control panel for three transmitters is installed, audio from both NAV and COM frequencies is combined, and is selected by the audio selector switches labeled NAV/COM, 1, 2 and 3.

COM AUTO AUDIO SELECTOR SWITCH

The audio control panel used with either one or two transmitters incorporates a three-position toggle switch, labeled COM AUTO, which is provided to automatically match the audio of the appropriate NAV/COM communications receiver to the radio selected by the transmitter selector switch.

COM BOTH AUDIO SELECTOR SWITCH

The audio control panel used with either one or two transmitters incorporates a three-position toggle switch, labeled COM BOTH, which is provided to allow both COM receivers to be monitored at the same time.

AUTO AUDIO SELECTOR SWITCH

The audio control panel used with three transmitters incorporates a three-position toggle switch, labeled AUTO, which is provided to automatically match the audio of the appropriate NAV/COM receiver to the selected transmitter.

ANNUNCIATOR LIGHTS BRIGHTNESS AND TEST SWITCH

The audio control panel used with either one or two transmitters incorporates a three-position toggle switch with NITE (up) and DAY (middle) positions to control the brightness level of the marker beacon indicator lights, and the BC and RN Nav indicator lights (when installed). In the TEST (down) position, all annunciator lights (Mkr Bcn, BC and RN) will illuminate full bright to verify lighting test.

NOTE

A potentiometer is installed inside the audio control panel to provide further minimum light dimming capabilities. Refer to the appropriate Avionics Service/Parts manual for adjustment procedures.

SIDETONE OPERATION

Cessna radios are equipped with sidetone capability (monitoring of the operator's own voice transmission). While adjusting speaker sidetone, be aware that if the sidetone volume level is set too high, audio feedback (squeal) may result when transmitting.

When the airplane has one or two transmitters, sidetone is provided in either the speaker or headset anytime the COM AUTO selector switch is utilized. Placing the COM AUTO selector switch in the OFF position will eliminate sidetone. Sidetone internal adjustments are available to the pilot through the front of the audio control panel (see figure 1).

When the airplane has three transmitters, sidetone will be heard on either the speaker or a headset as selected with the AUTO selector switch. Sidetone may be eliminated by placing the AUTO selector switch in the OFF position, and utilizing the individual audio selector switches. Adjustment of speaker and headset sidetone volume can only be accomplished by adjusting the sidetone potentiometers located inside the audio control panel.

NOTE

Sidetone is not available on HF Transceiver (Type ASB-125), when installed.

OPTIONAL INTERCOM SYSTEM

The optional intercom system is a pilot and copilot intercom phone system which is only offered with the one and two transmitter type audio control panel. The system incorporates its own audio amplifier with a volume control (labeled INT) and a "hot mike" feature. The intercom system is used with the headphones only.

The "hot mike" feature allows the pilot and copilot to communicate at anytime through their microphone/headsets without having to key the mike. However, they must key the mike button on their control wheel to transmit over the aircraft's transceiver. Sidetone is present on the intercom system when the AUTO switch is in the PHONE position.

NOTE

Any ambient noise attenuating type padded headset and boom mike combination is not compatible with this system.

The intercom audio volume is controlled by the INT knob located on the front of the audio control panel. Clockwise rotation of the knob increases the volume of the intercom audio and counterclockwise rotation decreases it. The INT knob controls the audio volume for the intercom system only. Receiver audio volume is adjusted using the individual receiver volume controls. When the intercom system is not being used, the volume control should be turned full counterclockwise to eliminate any noise over the headphones.

NOTE

When the intercom volume is turned up and an auxiliary mike is plugged in, there will be a loud squeal over the speaker if the COM BOTH and COM AUTO switches are inadvertently placed in the opposite positions (one in the SPEAKER position and the other in the PHONE position). To eliminate this squeal turn the volume down or place both switches in the same position.

When the optional intercom system is not installed, a plug button will be installed in place of the INT volume control knob.

SUPPLEMENT

STROBE LIGHT SYSTEM

SECTION 1 GENERAL

The high intensity strobe light system enhances anti-collision protection for the airplane. The system consists of two wing tip-mounted strobe lights (with integral power supplies), a two-position rocker switch labeled STROBE LT on the left switch and control panel, and a 5-amp "pull-off" type circuit breaker, labeled STROBE/AVN FAN, also located on the left switch and control panel.

SECTION 2 LIMITATIONS

Strobe lights must be turned off when taxiing in the vicinity of other airplanes, or during night flight through clouds, fog or haze.

SECTION 3 EMERGENCY PROCEDURES

There is no change to the airplane emergency procedures when strobe lights are installed.

SECTION 4 NORMAL PROCEDURES

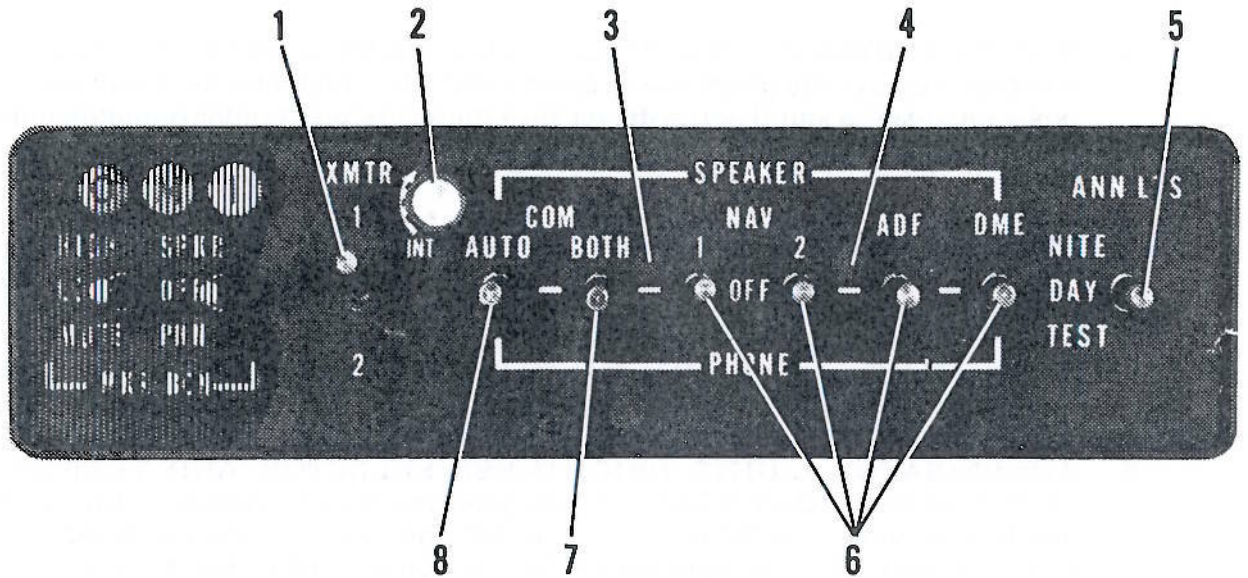
To operate the strobe light system, proceed as follows:

1. Master Switch -- ON.
2. Strobe Light Switch -- ON.

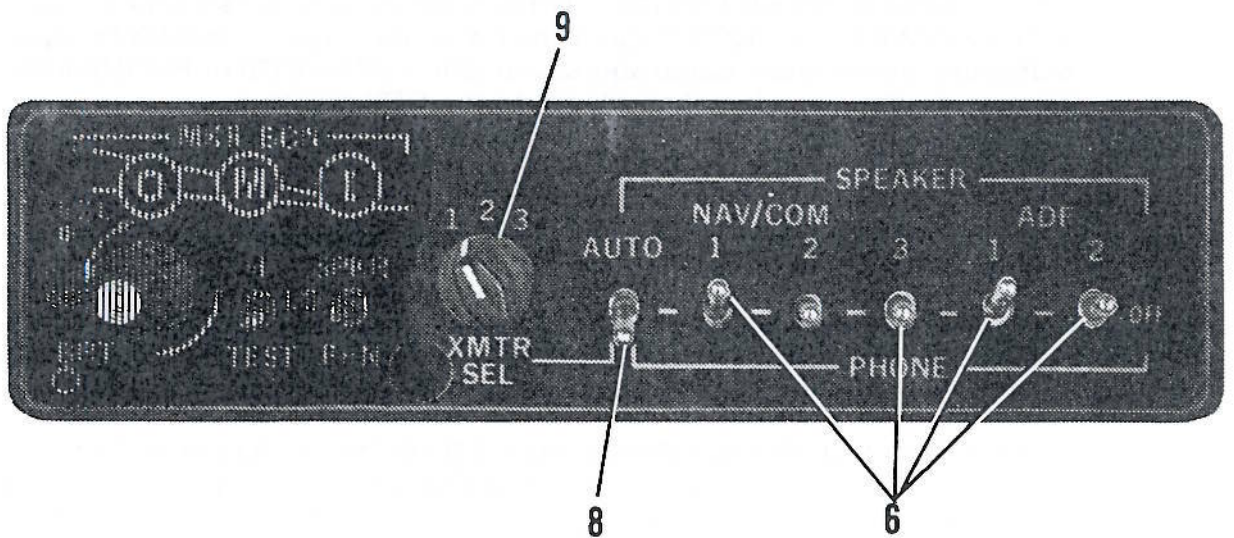
SECTION 5 PERFORMANCE

The installation of strobe lights will result in a minor reduction in cruise performance.

USED WITH ONE OR TWO TRANSMITTERS



USED WITH THREE TRANSMITTERS OR DUAL ADF'S



1. TRANSMITTER SELECTOR SWITCH (XMTR) - A two-position toggle switch used to activate the audio amplifier and switch the microphone to the desired transmitter. The number 1 (up position) and 2 (down position) corresponds to the first and second (from top to bottom) transmitters, respectively.

Figure 1. Audio Control Panel Operating Controls
(Sheet 1 of 2)

2. INTERCOM VOLUME CONTROL (INT) - Controls the intercom audio volume. Clockwise rotation of the knob increases the intercom audio volume and counterclockwise rotation decreases it.
3. HEADSET SIDETONE INTERNAL ADJUSTMENT ACCESS - To adjust headset sidetone, remove the plug button, place COM AUTO selector switch in the PHONE position, insert a small screwdriver into the adjustment potentiometer and rotate it clockwise to increase the sidetone volume or counterclockwise to decrease sidetone.
4. SPEAKER SIDETONE INTERNAL ADJUSTMENT ACCESS - To adjust speaker sidetone, remove the plug button, place COM AUTO selector switch in the SPEAKER position, insert a small screwdriver into the adjustment potentiometer and rotate it clockwise to increase the sidetone volume or counterclockwise to decrease sidetone. While adjusting sidetone, be aware that if the sidetone volume level is set too high, audio feedback (squeal) may result when transmitting.
5. ANNUNCIATOR LIGHTS BRIGHTNESS SELECTOR AND TEST SWITCH (ANN LTS-NITE/DAY/TEST) - Three-position toggle switch; in the up (NITE) position, annunciator lights (Mkr Bcn, BC and RN) will show at a reduced light level for typical night operations. In the center (DAY) position, annunciator lights (Mkr Bcn, BC and RN) will show full bright to verify lamp operation. In the NITE position, annunciator light (Mkr Bcn, BC and RN) level can be further adjusted down to a preset minimum using the RADIO LT dimming rheostat knob.
6. AUDIO SELECTOR SWITCHES - Three-position selector switches used to select either SPEAKER or PHONE operation for audio outputs. Enables the operator to select any one or more, audio signals on either SPEAKER or PHONE at the same time or to silence audio when placed in the OFF position.
7. COM BOTH AUDIO SELECTOR SWITCH (COM BOTH) - A three-position toggle switch used to allow both COM receivers to be monitored at the same time. Placing the COM BOTH switch in the up (SPEAKER) position will enable the pilot to monitor both the number 1 and number 2 COM receivers over the SPEAKER at the same time. Placing the switch in the down (PHONE) position allows the pilot to monitor both the number 1 and number 2 COM receivers through the headset at the same time. Center (OFF) position, removes the non-selected COM receiver (or both COM receivers if COM AUTO switch is OFF) from the audio system.
8. COM AUTO AUDIO SELECTOR SWITCH (COM AUTO OR AUTO) - A three-position toggle switch provided to automatically match the audio of the appropriate NAV/COM communications receiver to the transmitter selected by the transmitter selector switch. In the up (SPEAKER) position, audio from the selected receiver will be heard on the airplane speaker. In the down (PHONE) position, audio from the selected receiver will be heard through the headset. Center (OFF) position, removes the automatic SPEAKER/PHONE selection feature and will also disable the sidetone feature.
9. TRANSMITTER SELECTOR SWITCH (XMTR SEL) - A three-position rotary switch used to activate the audio amplifier and switch the microphone to the desired transmitter. The numbers 1, 2 and 3 positions correspond to the first, second and third (from top to bottom) transmitters, respectively.

Figure 1. Audio Control Panel Operating Controls
(Sheet 2 of 2)

SECTION 2 LIMITATIONS

There is no change to the airplane limitations when either of these audio control panels is installed.

SECTION 3 EMERGENCY PROCEDURES

In the event the audio amplifier in use fails, as evidenced by loss of all speaker audio, selecting an alternate transmitter will reestablish speaker audio using the alternate transmitter audio amplifier.

SECTION 4 NORMAL PROCEDURES

AUDIO CONTROL PANEL OPERATIONS:

1. Transmitter Selector (XMTR or XMTR SEL) Switch -- SELECT desired transmitter for transceiver operation.
2. COM AUTO or AUTO Selector Switch -- SELECT SPEAKER or PHONE position to automatically select SPEAKER or PHONE audio.

NOTE

If the NAV/COM audio selector switch corresponding to the selected transmitter is in the PHONE position with the AUTO selector switch in the SPEAKER position, all audio selector switches placed in the PHONE position will automatically be connected to both the airplane speaker and any headsets in use.

3. COM BOTH Selector Switch -- SELECT the same SPEAKER or PHONE position which was set on the COM AUTO selector switch to allow both COM receivers to be monitored at the same time.

NOTE

The combination of placing the COM AUTO switch in the SPEAKER position and the COM BOTH switch in the PHONE position (or vice versa) is not normally recommended as it will cause audio from both communications receivers (and any other navigation receiver with its audio selector switch in the PHONE position) to be heard on both the airplane speaker and the headset simultaneously.

4. Audio SPEAKER/PHONE Selector Switches -- SELECT desired SPEAKER or PHONE audio position only if COM AUTO switch is not used.
5. INT Control Knob -- ROTATE as desired to increase or decrease intercom audio volume.
6. ANN LTS Switch:
 - a. TEST Position -- SELECT to verify operation of marker beacon, BC and RN annunciator lights (when installed).
 - b. DAY Position -- SELECT for typical daytime lighting.
 - c. NITE Position -- SELECT for typical night lighting.

NOTE

In the NITE position, further lighting adjustment for the Mkr Bcn, BC and RN (when installed) annunciator lights can be obtained using the RADIO LT dimming rheostat knob.

SECTION 5 PERFORMANCE

There is no change to the airplane performance when either of these audio control panels is installed.

SUPPLEMENT

DME

(TYPE 190)

SECTION 1

GENERAL

The DME 190 (Distance Measuring Equipment) system consists of a panel mounted 200 channel UHF transmitter-receiver and an externally mounted antenna. The transceiver has a single selector knob that changes the DME's mode of operation to provide the pilot with: distance-to-station, time-to-station, or ground speed readouts. The DME is designed to operate at altitudes up to a maximum of 50,000 feet at ground speeds up to 250 knots and has a maximum slant range of 199.9 nautical miles.

The DME can be channeled independently or by a remote NAV set. When coupled with a remote NAV 1 set, the MHz digits will be covered over by a remote (REM) flag and the DME will utilize the frequency set by the NAV set's channeling knobs. When the DME is not coupled with a remote NAV set, the DME will reflect the channel selected on the DME unit. The transmitter operates in the frequency range of 1041 to 1150 MHz and is paired with 108 to 117.95 MHz to provide automatic DME channeling. The receiver operates in the frequency range of 978 to 1213 MHz and is paired with 108 to 117.95 MHz to provide automatic DME channeling.

All operating controls (except for a SPEAKER/PHONE selector switch mounted on the audio control panel supplied with one or two transmitters as described in another supplement in this section) for the DME are mounted on the front panel of the DME and are described in Figure 1.

SECTION 2

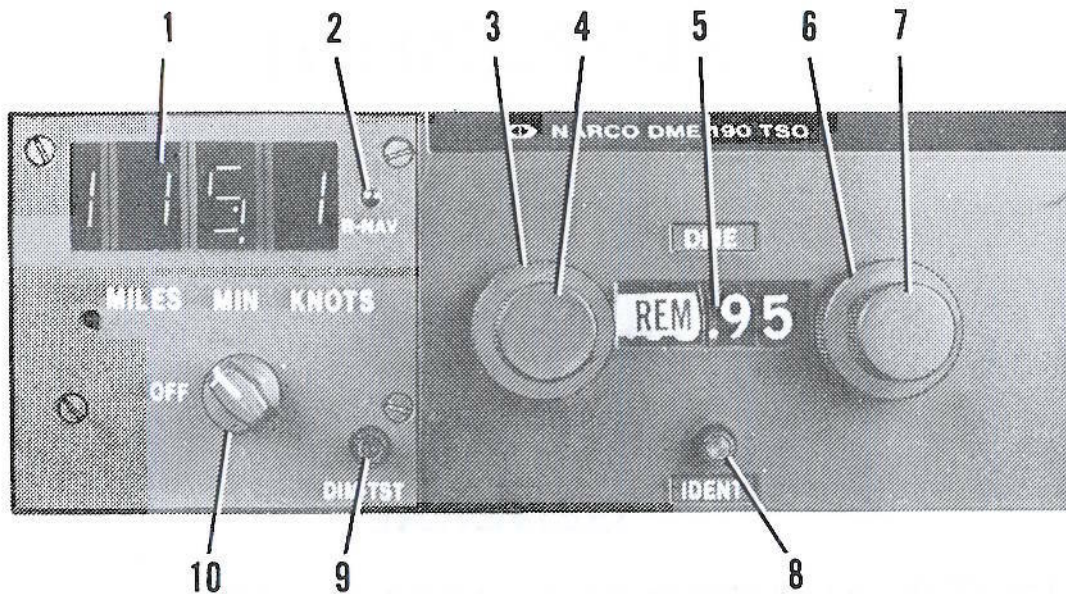
LIMITATIONS

There is no change to the airplane limitations when this avionic equipment is installed.

10

DME (TYPE 190)

PILOT'S OPERATING HANDBOOK SUPPLEMENT



1. READOUT WINDOW - Displays function readout in nautical miles (distance-to-station), minutes (time-to-station) or knots (ground speed).
2. R-NAV INDICATOR LAMP - The green R-NAV indicator lamp is provided to indicate the DME is coupled to an R-NAV system. Since this DME 190 is only factory installed with an R-NAV 511 system on Cessna airplanes, the R-NAV indicator lamp will never be illuminated. However, if a compatible R-NAV system is coupled to the DME, and when in R-NAV mode, the R-NAV lamp will light which indicates that the distance readout is the "way point" instead of the DME station. The DME can only give distance (MILES) in R-Nav mode.
3. REMOTE CHANNELING SELECTOR - Two position selector. In the first position, the DME will utilize the frequency set by the DME channeling knobs. In the second position, the MHz digits will utilize the frequency set by the NAV 1 unit's channeling knobs.
4. WHOLE MEGAHERTZ SELECTOR KNOB - Selects operating frequency in 1-MHz steps between 108 and 117 MHz.
5. FREQUENCY INDICATOR - Shows operating frequency selected on the DME or displays remote (REM) flag to indicate DME is operating on a frequency selected by the remote NAV 1 receiver.
6. FRACTIONAL MEGAHERTZ SELECTOR KNOB - Selects operating frequency in 50 kHz steps. This knob has two positions, one for the 0 and one for the 5.
7. FRACTIONAL MEGAHERTZ SELECTOR KNOB - Selects operating frequency in tenths of a Megahertz (0-9).

Figure 1. DME 190 Operating Controls (Sheet 1 of 2)

8. IDENT KNOB - Rotation of this control increases or decreases the volume of the received station's Ident signal. An erratic display, accompanied by the presence of two Ident signals, can result if the airplane is flying in an area where two stations using the same frequency are transmitting.
9. DIM-TST KNOB -
 - DIM: Controls the brilliance of the readout lamp's segments. Rotate the control as desired for proper lamp illumination in the function window (The frequency window is dimmed by the aircraft's radio light dimming control).
 - TST (PUSH TEST): This control is used to test the illumination of the readout lamps, with or without being tuned to a station. Press the control, a readout of 188 8 should be seen with the mode selector switch in the MIN or KNOTS position. The decimal point along with 188.8 will light in the MILES mode. When the control is released, and had the DME been channeled to a nearby station, the distance to that station will appear. If the station channeled was not in range, a "bar" readout will be seen (--- or -- -).
10. MODE SELECTOR SWITCH -
 - OFF: Turns the DME OFF.
 - MILES: Allows a digital readout to appear in the window which represents slant range (in nautical miles) to or from the channeled station.
 - MIN: Allows a digital readout (in minutes) to appear in the window that it will take the airplane to travel the distance to the channeled station. This time is only accurate when flying directly TO the station and after the ground speed has stabilized.
 - KNOTS: Allows a digital readout (in knots) to appear in the window that is ground speed and is valid only after the stabilization time (approximately 2 minutes) has elapsed when flying directly TO or FROM the channeled station.

Figure 1. DME 190 Operating Controls (Sheet 2 of 2)

SECTION 3

EMERGENCY PROCEDURES

There is no change to the airplane emergency procedures when this avionic equipment is installed.

SECTION 4

NORMAL PROCEDURES

TO OPERATE:

1. Mode Selector Switch -- SELECT desired DME function.
2. Frequency Selector Knobs -- SELECT desired frequency and allow equipment to warm-up at least 2 minutes.

NOTE

If remote channeling selector is set in REM position, select the desired frequency on the #1 Nav radio.

3. PUSH TEST Control -- PUSH and observe reading of 188.8 in function window.
4. DIM Control -- ADJUST.
5. DME SPEAKER/PHONE Selector Switch (on audio control panel) -- SELECT as desired.
6. IDENT CONTROL -- ADJUST audio output in speaker or headset.
7. Mode Selector Functions:
 - MILES Position -- Distance-to-Station is slant range in nautical miles.
 - MIN Position -- Time-to-Station when flying directly to station.
 - KNOTS Position -- Ground Speed in knots when flying directly to or from station.

CAUTION

After the DME 190 has been turned OFF, do not turn it on again for 5 seconds to allow the protective circuits to reset.

SECTION 5

PERFORMANCE

There is no change to the airplane performance when this avionic equipment is installed. However, the installation of an externally mounted antenna or several related external antennas, will result in a minor reduction in cruise performance.