FAA APPROVED

ROTORCRAFT

FLIGHT MANUAL

SUPPLEMENT NO.

CSP-C-1N REVISION NO. 9

SIKORSKY

MODEL

269C

PART 1

OPTIONAL INSTRUMENT/AVIONICS INSTALLATIONS

Sikorsky
A United Technologies Company

Approved by:

Manager, New York Aircraft
Certification Office, ANE-150

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INTRODUCTION

This supplement must be carried in the applicable basic FAA Approved 300C Model 269C Rotorcraft Flight Manual when the rotorcraft is equipped with any of the optional instruments or avionics whose operation is contained herein.

PART 1

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PART 1

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1	1, 2, 3, 5, 36A, 36B, 36C, 36D, 44, 47, 50	Revised to add KY 96A VHF Comm. Transceiver operation installation.	23 Nov 1994	
2	1, 2, 3, 5, 8, 40, 41, 42	Revised to add GNC 250/250XL COMM/GPS and removal of Tables 6-1, 6-2, and 6-3 from the weight and balance section.	09 Jan 1998	
3	1, 2, 3, 5, 16.1, 16.2, 16.3, 16.4	Revised to add KT76C Transponder operation instructions.	20 Jul 1999	
4	1, 2, 3, 5, 16.4	Revised to add GTX 320 Transponder operation instructions.	23 Jul 1999	
5	1, 2, 3, 5, 8, 40, 41, 42, 43, 44	Revised to add GPS 150/150Xl Navigation System Operation Instructions and miscellaneous other changes.	05 Nov 1999	
6	1, 2, 3, 4, 5, 39A, 39B, 39C, 39D, 40	Revised to add KX 155A VHF NAV COMM Operation Instructions.	23 Dec 1999	
7	1, 2, 3, 5, 43, 44, 45, 46	Revised to add GNS 430 COMM/NAV/GPS.	20 Nov 2000	
8	1, 2, 3, 5, 16.4, 16.5, 16.6	Revised to include GTX 320A and add GTX 327 Transponder Operating Instructions.	29 Mar 2001	
9	All	Revised Normal Procedures to segregate system descriptions to Part 2	15 May 2014	

PART 1

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SECTION I

OPERATING LIMITATIONS

SYSTEM LIMITATIONS

The installation of the optional equipment listed in this supplement is for VFR aircraft only, and does not make the aircraft eligible for approval to fly into IFR or IMC conditions.

If this aircraft has an installed GPS Navigation System, a placard (GARMIN P/N 161-00024-00, S.A.C. P/N 269A4646-265, or equivalent) stating "GPS limited to VFR use only" must remain installed on the instrument panel, in plain view of the pilot.

If this aircraft has an installed GPS Navigation System, the GPS manufacturer's operation manual must be immediately available to the flight crew.

SECTION II

NORMAL PROCEDURES

A full description of the operating procedures for optional instrument/avionics is contained in Part II of this supplement and/or the applicable Operator's Manual.

SECTION III

EMERGENCY PROCEDURES

In case of electrical system failure, all unnecessary electrical equipment should be turned "OFF" to conserve battery power.

Specific emergency procedures for optional avionics are provided in the individual operational instructions where applicable.

SECTION IV

PERFORMANCE DATA

None.

ROTORCRAFT

FLIGHT MANUAL

SUPPLEMENT NO.

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PART 2

OPTIONAL INSTRUMENT/AVIONICS INSTALLATIONS

EFFECTIVITY – OPTIONAL ON ALL MODEL 269C HELICOPTERS EQUIPPED WITH A 28 VOLT ELECTRICAL SYSTEM

Date of Issue:
15 May 2014

Date of Revision:

INTRODUCTION

This document supplements the information contained in the 269C FAA Approved Rotorcraft Flight Manual (RFM) when optional instruments/avionics installations are installed. For system descriptions and functionalities not addressed in this supplement, consult the applicable RFM.

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PART 2

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PART 2

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PART 2

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SECTION 1

SYSTEM DESCRIPTION

INSTRUMENTS AND AVIONICS

This section provides the operation procedures for the optional instrument/avionics components as supplied by the component manufacturer.

KR 87 ADF OPERATING INSTRUCTIONS

It is recommended that the KR 87 unit be turned off when the aircraft engine is started in order to prevent possible voltage transient damage to the radio. The unit is turned on by rotating the volume control clockwise past the detent. The volume control is used to adjust the audio output for comfortable listening level.

NOTE

The audio muting feature of the KR 87 will cause the audio output to be muted unless the receiver is locked onto a valid station. This reduces interstation noise and aids the pilot in identifying usable stations.

OPERATING MODES

The KR 87 Automatic Direction Finder has two operational modes. In the ANT (Antenna) mode (ADF button out) the loop antenna is disabled, and the unit simply acts as a receiver, allowing audio reception through the speaker or headphones. The indicator needle will remain parked at the 90$ relative position and the ANT message on the left side of the display will be lighted. This mode provides slightly clearer audio reception, and is used for station identification. In various parts of the world, some L/MF stations use an interrupted carrier for identification purposes. A Beat Frequency Oscillator (BFO) function is provided to permit these stations to be more easily identified. Pushing the BFO switch will cause a 1000Hz tone to be heard whenever there is a radio carrier signal present at the selected frequency. It will also light the BFO message in the center of the display.

With the ADF button depressed, the unit is placed into the ADF mode and the loop antenna is enabled. The AFG message on the left side of the display will be lighted and the indicator needle will point to the relative bearing of the selected station. In order to tell if there is a sufficient signal for navigational purposes, the pilot can place the KR 87 back in the ANT mode, parking the indicator needle at 090°. When the unit is then switched to the ADF mode, the needle should slew to the station bearing in a positive manner, without excessive sluggishness, wavering, or reversals.

FREQUENCY CONTROL

A. Active Frequency (The frequency to which the ADF is turned)

The active frequency is displayed in the left hand window. This frequency may be changed with the concentric knobs when either timer mode (FLT or ET) is being displayed in the right hand window. The exception to this is when the ET message is flashing (see below). To set the 10's digit push the small knob in and rotate it. Clockwise rotation will increment the digit. The digit will roll over at 9 to 0 and roll under (when turning the knob counterclockwise) at 0 to 9. With the small knob pulled out the 1's digit may be set. Its operation is the same as for the 10's digit.

Turning the large knob changes the 100's digit and the 1000's digit. The 100's digit carries to the 1000's digit from 9 to 10 and borrows from 10 to 9. The two digits roll over from 17 to 02 and under from 02 to 17 thus limiting the frequencies to the range of 200KHz to 1799Hz.

B. Standby Frequency

The standby frequency is displayed in the right window when the FRQ message is lighted. When this is the case, this frequency may be changed with the knobs in a manner similar to that explained above for the active frequency.

If the standby frequency is not being displayed it may be called to the window by pressing the FRQ button. Pressing this button when the standby frequency is displayed causes the current standby and active frequencies to be exchanged.

TIMERS

A. FLT/ET Button

If elapsed time (ET) is currently displayed the FLT/ET button will cause the flight timer to be displayed. Pressing this button again will exchange the two timers in the display. If the standby frequency is displayed the FLT/ET button will cause the timer which was last displayed to reappear in the window. (Note: When power is first applied, the flight timer is displayed).

B. Flight Timer

The flight timer is displayed in the right hand window when the FLT message is lit. This timer will count up to 59 hours, 59 minutes, 59 seconds. When the unit is first turned on this timer is automatically started at 0. Minutes and seconds will be displayed until a value of 59 minutes and 59 seconds is reached. On the next count the display will shift to hours and minutes.

C. Elapsed Timer

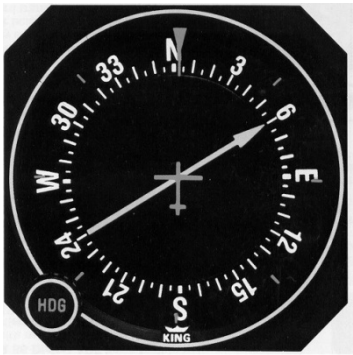
This timer has two modes: Count Up and Count Down. When power is applied it is in the Count Up mode starting at 0. As is true with the flight timer, the elapsed timer will count to 59 hours, 59 minutes, 59 seconds, displaying minutes and seconds until one hour has elapsed, then displaying hours and minutes. When in the Count Up mode the timer may be reset to 0 by pressing the reset button. (Note: Pressing the reset button will reset the elapsed timer regardless of what is currently being displayed).

To enter the Count Down mode, the Reset (RST) button is held depressed for approximately 2 seconds until the ET message begins to flash (this may be done regardless of current display). While the ET message is flashing the timer is in the ET Set mode. In this mode a number up to 59 minutes, 59 seconds may be preset into the elapsed timer with the concentric knobs. With the small knob pressed in the 10's of seconds digit may be changed; it will roll over from 5 to 0 and under 0 to 5. With the knob pulled out the 1's of seconds digit may be changed. It rolls over from 9 to 0 and under from 0 to 9. The larger knob modifies the minutes. It rolls over from 59 to 0 and under from 0 to 59. The timer will remain in the ET Set mode (ET message flashing) for 15 seconds after a number is set in or until the RST, FLT/ET, or FRQ button is pressed. The number preset will remain unchanged until the RST button is pressed. When the RST button is pressed after a number is preset, the elapsed timer will start counting down. (Note: The timer will start when RST is pressed regardless of the current display).

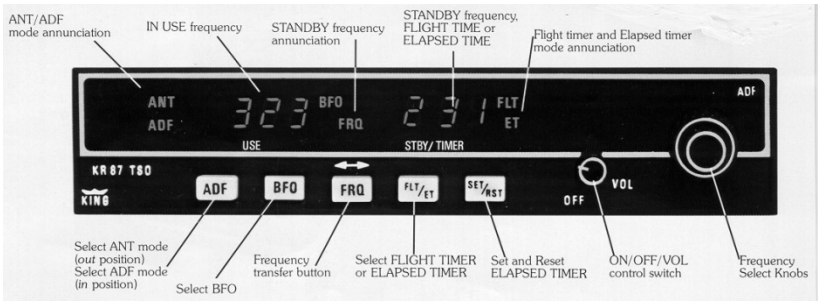
When the timer reaches 0 it changes to the Count Up mode and continues up from 0. Also the right hand display will flash for 15 seconds and the timer alarm line will be pulled low for 1 second. While the elapsed timer is counting down, pressing the RST button will have no effect unless it is held for approximately 2 seconds. This will cause the timer to stop and enter the Set mode (ET message flashing).

NOTE

ADF bearing information may be displayed on KI 229 RMI. Refer to KI 229 RMI operation instructions when KI 229 RMI is installed.



KI 227 ADF Indicator



NOTE

The KR 87 does not have an aural timer alarm output. Provisions for connection of an external aural timer alarm have been made.

KR 87 Control Functions

KR 21 MARKER BEACON OPERATING INSTRUCTIONS

Marker beacon receivers are used to provide accurate fixes by informing the pilot of his passage over beacon stations located on airways and ILS approach courses. Three types of beacons are used. They are the inner marker, the outer marker and the middle marker.

The outer, middle and inner markers are used in conjunction with the radio instrument landing systems. The outer marker is normally positioned on the front localizer course near the point where the glideslope approach path intersects the minimum inbound altitude after the procedure turn. Distance from the airport will vary from 4 to 7 miles. Radio frequency from the marker is projected vertically in an elliptical cone shaped pattern. The marker signal is modulated at 400 Hz and is keyed to emit dashes at a rate of two per second.

When passing the outer marker the blue light will flash “on/off” at a two per second rate and the pilot will hear a series of low tone dashes.

The middle marker is normally located on the front localizer course about 3200 feet from the approach end of the ILS runway. The radiated pattern is similar in shape and power to the outer marker. The middle marker signal is modulated with 1300 Hz and the modulation is keyed to identify by alternate dots and dashes. When the KR 21 equipped aircraft passes the middle marker the pilot hears a medium pitched tone in a series of dots and dashes and the amber light flashes synchronously with the tones.

The inner marker is located close to the end of the runway. The beacon transmitter and antenna are designed to project a cone shaped pattern of 75MHz energy, vertically. The radio frequency output of the transmitter is modulated with an audio tone of 3000 Hz. An aircraft equipped with the KR 21 will receive a 3000 Hz tone in headphone or speaker and the white lamp will be lighted while over the station. The inner marker is used to indicate a point approximately 1500 feet from the runway and if on proper glide path the altitude above the runway should be approximately 100 feet.

The Hi-Lo Switch in the KR 21 provides sensitivity switching control. Many marker receivers provide only a “low sensitivity” position. The effect of the high sensitivity position is to greatly enlarge the size of the cone shaped “area of indication” above the station. An aircraft flying at high altitude or slightly off course may fail to receive the signal when in the low sensitivity position. It is suggested that the KR 21 marker sensitivity switch first be placed in high sensitivity position until aural and/or lamp indication is received. The control switch may be turned to low sensitivity to reduce the duration of the indication and to obtain a more accurate reading of passage since the signal appears to build and fade faster on low sensitivity.

The high sensitivity position may be used to effectively give the pilot an advance indication that he is approaching the outer marker. In order to expedite the ILS approach the pilot may wish to retain higher speed until he is nearby the outer marker inbound. With the KR 21 marker in high sensitivity position the aural tone will begin about one mile from the outer marker. At this time, the pilot may switch the KR 21 marker to low sensitivity and reduce engine power for final approach speed, also retrim and perform cockpit checks. He is then prepared to begin descent when the marker indicates actual passage over the outer marker and the glideslope is intercepted.

KT 76A TRANSPONDER OPERATING INSTRUCTIONS

The transponder is turned on by rotating the functions selector from the off position to any other position.

NOTE

The KT 76A should be turned off before starting aircraft engine(s).

After being turned on, there is a 45 second delay before the unit becomes functional. This is to permit the transmitter tube to warm up and stabilize. Usually the function switch will be rotated to the “standby” position, however, any operative position will initiate the time delay turn on. Any time that the function switch is in the “ON” or “ALT” position the transponder becomes an active part of the beacon system. It is undesirable from a systems view point to be operating (function selector in either of these positions) while on the ground, taxiing, or running up at a terminal with a co-located beacon interrogator. Attention should be paid to the code selected on the control head. The selected code should be in accordance with instructions for IFR flight or rules applicable to transponder utilization for VFR flight.

NOTE

Never activate the transponder with either Code 0000, 7700 or 7777 selected on the control head. Code 7700 is selected for emergencies.

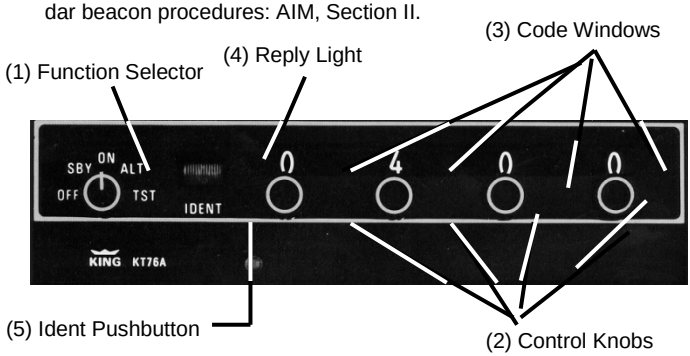
During normal transponder operation, a flashing lamp is an indication of a transmitted reply. An interrogation will normally be at 10-15 second intervals. Lamp flashes within this interval may be from noise, a second or third interrogator, or from side lobes from interrogators without side lobe suppression.

“ON” function will be the customary mode of operation. If an altitude digitizer is part of the system then “ALT” function will be selected if altitude reporting is requested by traffic control. “ALT” function enables the transponder to encode an altitude reply.

The IDENT feature is used at the request of the traffic controller. The IDENT button is depressed momentarily and then released. A memory holds the IDENT reply for an interval to assure the proper reply for at least one radar sweep. This memory also turns the reply lamp on steady as an indication of the ident function.

NOTE

Consult the airport/facility directory section of the Airmans Information Manual for the location of radar beacons. Air traffic control radar beacon system (ATCRBS) Description: AIM, Section I. Radar beacon procedures: AIM, Section II.



KT76C TRANSPONDER OPERATING INSTRUCTIONS

MODE SELECT KNOB POSITIONS

OFF - The unit is not energized.

Standby - The unit is energized, but is inhibited from replying to any interrogation. “SBY” is annunciated on the display, in this mode. The altitude display is blank.

TEST - The unit will illuminate all segments and characters, in “TST." No transponder replies are transmitted in “TST,” but display lighting level may be adjusted.

On - The unit replies Mode A, only. The altitude display is blank. “ON” is annunciated on the display. This mode is usually used to salvage position reporting, when an altitude reporting malfunction or condition threatens to preclude acceptable transponder use.

Altitude - This is the normal use mode. The unit sends a Mode A four digit (one of 4096) “squawk” ID (identification) code and a Mode C encoded altitude, in response to valid interrogations. The altitude information will be shown as a FL, on the left half of the display. The four digit “squawk” code will be displayed on the right half of the display. “ALT” and “FL” are annunciated on the display, in this mode.

PUSH BUTTONS

IDENT - Depressing the “IDT” push button causes the special position identification pulse (SPI) to be appended to Mode A replies, for a period of 18 ± 2 seconds. During this period the KT 76C will annunciate the “R”.

Buttons 0 through **7** are used to write (left to right) the four digit Mode A “squawk” code, displayed in the right hand ident window of the display. The CLR clear key works like a typewriter backspace key and erases displayed identification code digits, from right to left. The Mode A code may be selected in the Standby, On, and Altitude modes.

Three to four seconds after this code has been entered, or immediately after the “IDT” pushbutton has been pressed, the new code is transmitted. This code is written into non-volatile memory, so the code will be saved, when the power is switched “OFF.”

VFR - Momentarily depressing the “VFR” pushbutton causes the preprogrammed VFR “squawk” code (usually 1200) to replace whatever code was previously entered. The new “squawk” code will be immediately displayed, and transmitted 4 to 6 seconds later. This “squawk” code will be stored as the last active code, just as if it were entered from the front panel pushbuttons.

The VFR code is programmed by the following sequence:

(1) Place the unit in Standby

(2) Enter in the desired VFR code, with the code pushbuttons.

(3) Depress the “VFR” pushbutton while holding the “IDT” pushbutton in its depressed position. This will both use and store this code.

NOTE

Pressing and holding the “VFR” Pushbutton for two seconds will switch back to the last non-VFR “squawk” code. Therefore, the VFR button can be used to switch back and forth between two “squawk” codes, and they are both remembered, even when the equipment is switched “OFF".

DISPLAY

REPLY – The display indicator “R”, is illuminated for 750 msec ± 100 msec when the transponder is replying to a valid interrogation, and during the 18 ± 2 seconds SPI transmission, following pressing the IDT ident button.

ALTITUDE DISPLAY

The KT 76C displays the Flight Level altitude on the left side of the display. The display is in hundreds of feet. “FL” is annunciated to indicate Flight Level altitude. Flight Level is a term to indicate that the altitude is not true altitude, but barometric altitude, which is not corrected for local pressure. For Example, “Fl - 040"pressure. For Example, “Fl - 040" corresponds to an altitude of 4000 feet, if mean sea level pressure is 29.92 inches of mercury. The Flight Level altitude is only displayed when the altitude reporting is enabled, i.e. in Altitude mode. If an invalid code from the encoder is detected, dashes will appear in the altitude window. Altitude reporting is disabled, if the altitude window is blank or has dashes.

DISPLAY BRIGHTNESS ADJUSTMENT

The upper left corner of the display has a photo sensor that continuously adjusts the display brightness according to the present cockpit light level. There is also a general lighting level adjustment, to compensate the brightness for pilot preference or aging of the display. This general brightness level is adjusted in the test (TST) mode. To adjust the display general brightness, perform the following steps:

a. Turn the mode select knob to “TST”.

b. Press the “0" pushbutton to decrease brightness by 10%

c. Press the “7" pushbutton to increase brightness by 10%.

d. Press the “4" pushbutton to set brightness to the 50% default setting.

e. Remove the mode select knob from the “TST” mode, to set display general brightness programming.

NOTE

In the test mode, four carets will show up below the four Mode A code digits. The next activation of a 0, 4, or 7 button will switch these carets to showing the display's programmed general lighting level.

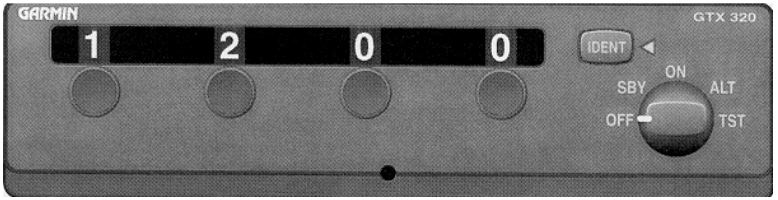
One caret = 10, 20, or 30%.

Two carets = 40, 50, or 60%.

Three carets = 70, 80, or 90%.

Four carets = 100% (maximum) general lighting level.

GTX 320/320A TRANSPONDER OPERATING INSTRUCTIONS



Detailed operating instructions can be found in the (GARMIN P/N 190-00133-09) GTX 320/320A Pilot's Guide. Some highlights of that pilot's guide are printed here.

Operation of this transponder will be very familiar to most pilots. Many pilots will only need to know that the reply light is the little caret beside the IDENT button, and that the TST function only tests the reply light. Pressing the IDENT button causes the special identification pulse to be added to any normal Mode A or Mode C replies, and it lights the reply light, for 20 seconds. ON provides only Mode A replies. ALT provides both Mode A and Mode C (altitude) replies, and is the normal operating mode.

When changing codes in ON or ALT, do not pass through codes 0000 (government), 7500, (hijack), 7600-7677 (COMMunication failure), or 7700-7777 (EMERGENCY), or it may trigger an automatic alarm, at Air Traffic Control.

GTX 327 TRANSPONDER OPERATING INSTRUCTIONS

Detailed operating instructions can be found in the (GARMIN P/N 190-00187-00) GTX 327 Pilot's Guide. Some highlights of that Pilot's Guide (and the Installation Manual) are printed here.

Many pilots will only need to know that the (Mode A) reply code is usually displayed, and that pressing a number button starts over writing in a new reply code (left to right). During new code entry, the CLR button works as a backspace, and the CRSR button cancels a partial (less than four number button presses) entry. As expected, SBY switches the radio ON but allows no replies, ON starts only Mode A replies, ALT starts both Mode A and C replies, and OFF switches the transponder OFF (if held in for at least two seconds). If the helicopter has an optional Avionics Master Switch, the GTX 327 will remember which mode was selected before the Avionics Master was switched OFF. There is no TEST mode to test the reply light because there is no separate reply light; there is, instead, a circled "R" that shows up on the lower left corner of the display, for a reply indicator. The IDENT button activates 18 seconds of IDENT and adds the word "IDENT" to the upper left corner of the display. The VFR button toggles to and from a VFR code (usually 1200) from the entered Mode A reply code that is remembered (even during shut down) until a new code is four button entered. (The VFR code may be pilot selected, in the Configuration mode.)

Pressing the FUNC button advances the PRESSURE ALT part of the display through three different six digit stopwatch type timers: a FLIGHT TIME duration timer, a similar COUNT UP timer, and a reverse operating COUNT DOWN timer (that may all be operated simultaneously), and then back to (encoder) altitude. Use the CRSR button and six presses of the ten number buttons, to select the starting time for the count down timer. The START/STOP button starts or stops (and the CLR button resets) whichever timer is presently in view. When the COUNT DOWN timer passes zero, it flashes and continues as a count up timer, and "COUNT DOWN" is replaced by "EXPIRED." When the PRESSURE ALT (altitude encoder output) function is displayed, an up or down arrow will appear, to the right side of "PRESSURE ALT," when the helicopter rate of climb exceeds the number of feet per minute selected in the Configuration mode. This altitude display can be pilot configured to read flight level, feet or meters.

When changing codes in ON or ALT, do not pass through codes 0000 (government), 7500, (hijack), 7600-7677 (COMMunication failure), or 7700-7777 (EMERGENCY), or it may trigger an automatic alarm, at Air Traffic Control.

KT 79 TRANSPONDER OPERATING INSTRUCTIONS

NOTE

The KT 79 and all other avionics should be turned off before starting the aircraft engine(s)

FUNCTIONAL MODES

A. Off - The unit is not energized.

B. Standby - The unit is energized, but is inhibited from replying to any interrogations. “SBY” is enunciated on the display in this mode.

C. On - The unit is able to reply to Mode A and Mode C interrogations, but the altitude information of a Mode C reply is suppressed. “ON” is enunciated on the display in this mode.

D. Altitude Enabled – All information pulses are supplied in both Mode A and C replies. This is the normal mode of operation on aircraft equipped with altitude digitizers. “ALT” is enunciated on the display in this mode.

E. Test - Allows the pilot to evaluate the integrity of the unit. All display segments should illuminate in this mode. Transmissions are suppressed.

Mode selection is accomplished by rotating the outer knob (Mode Select).

IDENT

Depressing the “IDT” pushbutton causes the special ident pulse to be appended to Mode A replies for a period of approximately 23.5 seconds. During this period, “IDT” is illuminated on the KT 79 display and the ident symbol appears at the aircraft's location on the ground controller's screen. An input pin is provided on the rear connector to provide for an external ident operation.

ID CODE

The identification code for the aircraft is displayed in the right hand position of the display. Note that beneath each digit is a triangular pointer. The pointer designates which digit will be incremented or decremented when the inner knob (Inc/Dec) is rotated clockwise or counterclockwise. The pointer is rotated from left to right by pressing the Inc/Dec knob against its spring loaded switch. Thus when a pilot wishes to enter an ID code, he can do so by rotating and depressing a single knob. After five seconds have elapsed since an Inc/Dec operation or pointer advance, the following occur:

A. The pointer returns to the leftmost position.

B. The new code is written into non-volatile memory so that the code will not change during power interruption.

C. The transponder circuitry is given the new code for transmission to the ground. This delay precludes the transmission of erroneous codes during the ID code entry process.

Depressing the “IDT” pushbutton terminates the five second delay.

NOTE

Never activate the transponder with either Code 0000, 7700 or 7777 selected on the control head. Code 7700 is selected for emergencies.

VFR

Depressing the VFR pushbutton causes the preprogrammed VFR code to supercede whatever code was previously entered.

The VFR code is programmed by the following sequence:

A. Place the unit in “SBY”

B. Dial in the desired VFR code (for instance, 1200).

C. Depress the VFR pushbutton while holding the IDT pushbutton in its depressed position.

This sequence places the new VFR code in non volatile memory for subsequent call up.

REPLY

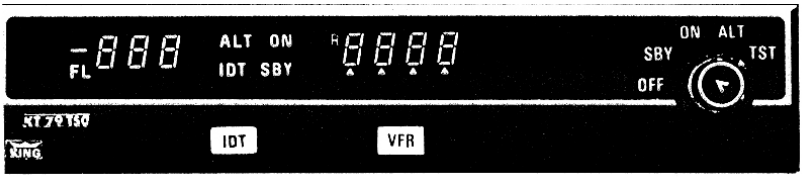
The reply indicator (“R”) illuminates in the display when the transponder is replying to valid interrogations. During test mode the reply indicator should fail to illuminate if a receiver fault is detected.

ALTITUDE DISPLAY

The KT 79 is the first general aviation transponder to provide continuous Flight Level altitude display. Flight Level (FL) is a term used to indicate that the altitude under consideration is not true altitude, but barometric altitude which has not been corrected for local pressure. The display is in hundreds of feet, for example, “FL 040” corresponds to an altitude of 4,000 feet, meaning sea level pressure of 29.92 inches of mercury. This information is intended for use only as coarse redundancy for the primary altitude measuring system.

Flight Level altitude information is displayed only when altitude reporting is enabled (“ALT”mode). This is so the display reflects only that information which is being transmitted to the ground. In addition, an invalid code from the altitude digitizer is detected by the decoding circuitry and indicated on the display by dashes appearing in the altitude window. Altitude reporting will be disabled under this condition.

Drawing is in the Altitude (ALT) Mode



Drawing is in the Test (TST) Mode

AUDIO PANEL INSTRUCTIONS

The top row of pushbutton on the KMA 24H selects the audio to be heard on the speaker. The bottom row of pushbuttons selects the audio to be heard on the headphones. The selections are independent of each other allowing the same audio input to be selected for both speaker and headphones if desired. The AUTO pushbuttons (on 066-1055-52 and -53 versions only) when selected will cause the audio from the transceiver selected with the MIC SELECT switch to be heard. On units with ADF 2 instead of AUTO (066-1055-50 and -51), the transceiver audio must be selected with the HF or TEL, COM 1 and COM 2 pushbuttons.

The MIC SELECT switch performs several functions. It routes microphone audio and keying to the appropriate destination, switches the speaker amplifier output to the appropriate speaker and tuns the speaker amplifier power on and off. The headphone amplifier power, however, is always on. In the HF or TEL, COM 1 and COM 2 positions, microphone audio and keying are routed to the appropriate transceiver and the speaker amplifier output is connected to the cockpit speaker. In the P.A. position, microphone audio is routed to the speaker amplifier, microphone keying is connected to the P.A. mute line and the speaker amplifier output is connected to the passenger address speaker. In the EXT position, microphone audio is routed to the speaker amplifier and the speaker amplifier output is connected to the external (ramp hail) speaker. In both P.A. and EXT positions, any audio inputs selected on the top row of pushbuttons will be heard though the speaker until MIC 1 or MIC 2 is keyed. Keying causes the input audio to be muted and the microphone audio to be heard. The P.A. mute line may be used to mute the normal passenger address audio while MIC 1 or MIC 2 is keyed in P.A. position.

The 8 ohm tap on the speaker amplifier output transformer serves as the emergency headphone output. It may be used in the event of failure of the headphone amplifier; however, it should be noted that the top row of pushbuttons (labeled Speaker) selects the audio to be heard on the emergency headphone output.

The KMA 24H has five ICS (Intercom Station) inputs, pilot, co-pilot and three others. These inputs are always active or “hot”. The volume of all five ICS inputs is controlled by the INT VOL (Intercom volume) control on the front panel. This control affects the volume of intercom only; it does not affect the volume of the audio inputs selected with the pushbuttons. When the INT VOL control is turned completely counterclockwise the ICS inputs will not be heard. This will also eliminate the background noise just as effectively as an ICS off switch. Some installations may use a relay or switch external to the KMA 24H to defeat the hot intercom. In this case an ICS key will be used to activate the intercom and no background noise will be heard until the ICS is keyed. Yet another possible installation configuration is one utilizing hand held microphones. In this case an Intercom/Transmit switch is required external to the KMA 24H. With this switch in the Transmit position, keying the pilot or co-pilots microphones will cause transmission over the transceiver selected by the MIC SELECT switch. With this switch in the intercom position, no background noise will be heard until microphone is keyed causing the audio of that microphone to be heard. In all installations, ICS 3, ICS 4, and ICS 5 should have an ON/OFF switch in series with them. These switches should be kept in the OFF position when these stations are not in use to reduce the background noise to a minimum.

When either the pilot or co-pilot keys the microphone to transmit, all other microphone inputs are muted to insure that the keyed microphone is the single source of the transmitted audio. The audio inputs selected from the front panel pushbuttons are also muted while the pilot or co-pilot is transmitting. If the pilot and co-pilot should both key their microphones at the same time, the pilot's mic will override the co-pilot's. This pilot microphone priority does not apply to dual KMA 24H installations. In these installations, each audio panel can be keyed independent of the other.

KI 229 RMI OPERATION INSTRUCTIONS

The KI 229 Radio Magnetic Indicator (RMI) display is discussed below.

A. Compass Card/Lubber Line

This rotating card repeats gyro stabilized magnetic compass information. Aircraft heading is read from the compass card under the orange lubber line.

B. ADF Pointer

The arrow of the double yellow pointer indicates magnetic heading to the ADF station.

C. VOR Pointer

The arrow of the single green pointer indicates the magnetic heading to a VOR station or Area Navigation Way point. This pointer can also be made to read magnetic heading to another ADF station by an external switch.

The KI 229 RMI repeats magnetic heading information from the KI 525A Navigation Indicator or other slaved directional gyro system. Aircraft heading is read under the lubber line of the KI 229. (Refer to KCS 55A PNI system operation for KI 525A operation).

When the ADF receiver is tuned to a station, the yellow ADF pointer indicates the magnetic heading to the station. Thus, if the pilot desires to fly toward the station, he merely turns his aircraft to the magnetic heading indicated by the ADF pointer.

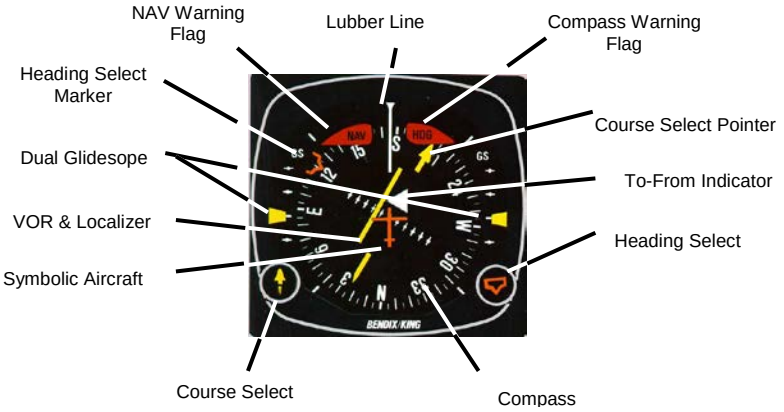
When the VOR receiver is tuned to a VOR station, the green VOR pointer indicates the magnetic heading to the station. If the KI 229 is used in an Area Navigation System, the VOR pointer indicates the magnetic heading to the way point. The green pointer can also be made to give magnetic heading for a second ADF receiver by the addition of an external switch and installation of a second ADF receiver.

Should a localizer frequency be selected, or the VOR receiver indicate a flagged condition, the VOR pointer (green pointer) is parked 90º to the right of the lubber line.

When the ADF is not in use or if a weak ADF signal is received, the ADF (yellow pointer) will park at 90º to the right of the lubber line.

RMI OPERATION

The KI 229 Radio Magnetic Indicator provides bearing information to both ADF and VOR stations by means of two pointers, each of which is read against the compass card. The servo drive compass card displays heading information derived from ARINC type X, Y, Z, compass headings. The double pointer is dedicated solely to a ADF DC SIN/COS source. The single pointer is assigned to VOR information. (Note: The single pointer can be switched between VOR and ADF by means of an external switch as explained in the installation manual of the KI 229).



KI 525A PNI (Part of KCS 55A system)
(Pectorial Navigation Indicator)

KNI 229 Radio Magnetic Indicator

KN 53 NAV. RECEIVER OPERATION INSTALLATION

It is recommended that power to the KN 53 be turned on only after engine start-up, as this procedure increases the reliability of the solid state circuitry.

The KN 53 front panel controls consist of:

A. OFF/VOL/IDENT

B. Frequency Select

C. Frequency Transfer

The unit is turned on by rotating control A clockwise. The power off position is felt by counterclockwise rotation into a positive switch detent action. The NAV volume output is increased by clockwise rotation of control A. Voice NAV information is heard when control A is pushed in. When control A is pulled out, the Ident signal plus voice information may be heard.

The outer knob of control B is the MHz select and moves CW or CCW in one MHz steps. The inner knob is the KHz select and moves CW or CCW in 50KHz steps.

NOTE

To increase frequency rotate knobs clockwise; to decrease frequency rotate knobs counterclockwise. Moving either knob of control B will only update standby displayed frequency. Remote KME, internal glideslope (KPN 0660-1067-00 only) and ILS channeling are also performed by this control.

The standby frequency can be moved to the use (active) frequency by momentarily depressing the frequency transfer switch, control C (i.e. when the frequency transfer switch is energized, the use frequency and standby frequency trade places).

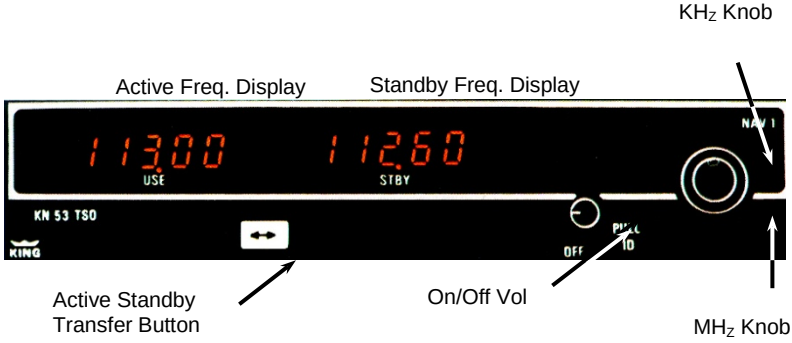
The KN 53 gas discharge display brightness will automatically compensate for changes in ambient light level. The dimming is controlled by a photocell mounted behind the front panel lens to the left of the display.

The KN 53 has 2 x 5 DME channeling information outputs. KME's like the King KN 62A can be channeled by the KN 53 outputs. (The KN 62A must be in the RMT mode).

NOTE

At low altitudes VOR ground station scalloping may be present.

Flight test the ILS operation by flying a simulated ILS approach. Check localizer LIFT RIGHT deflection and, if applicable, glideslope deflection. Check the localizer accuracy in relation to the ILS runway. Check the glideslope accuracy in relation to the published ILS approach altitude.



KN 53 Control Functions

KN 62A DME OPERATION INSTRUCTIONS

It is recommended that power to the KN 62A be turned on only after engine start-up, as this procedure increases the reliability of the solid state circuitry.

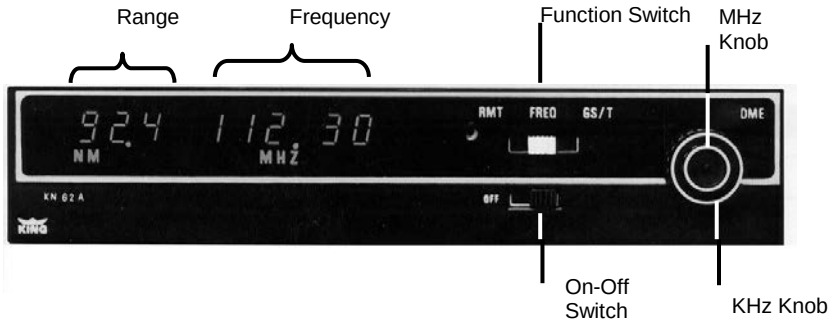
The KN 62A front panel controls consist of an ON-OFF switch, a function switch, and frequency selection knobs (Figure 3-1). The function switch determines both the information displayed and the channeling source for the KN 62A. In Remote (RMT) mode, the KN 62A is channeled from an external control head, and the display shows range, speed, and time-to-station. In Frequency (FREQ) mode, the KN 62A is channeled from its own frequency selection knobs, and the display shows range and frequency. In Ground Speed/Time-to-Station (GS/T) mode, the KN 62A holds the last internally selected frequency and displays range, speed, and time-to-station.

The frequency hold feature in GS/T mode is necessary to prevent accidental rechanneling of the DME when frequency is not being displayed. To prevent the unit from displaying false information, the KN 62A will display dashes and stay in “search” whenever power is turned on or momentarily interrupted in GS/T mode. Normal operation is re-established by switching to FREQ or RMT mode.

When the KN 62A is locked to a ground station, range is displayed to the nearest 0.1 nautical mile from 0 to 99.9 nautical miles and to the nearest 1 nautical mile from 100 to 389 nautical miles. Ground speed is displayed to the nearest knot from 0 to 999 knots. Time-to-station is displayed to the nearest minute from 0 to 99 minutes. When the KN 62A is in search mode, dashes are displayed instead of range, speed, and time-to-station. An automatic dimming circuit adjusts the brightness of the display to compensate for changes in ambient light level. The dimming is controlled by a photocell mounted behind the front panel to the left of the display.

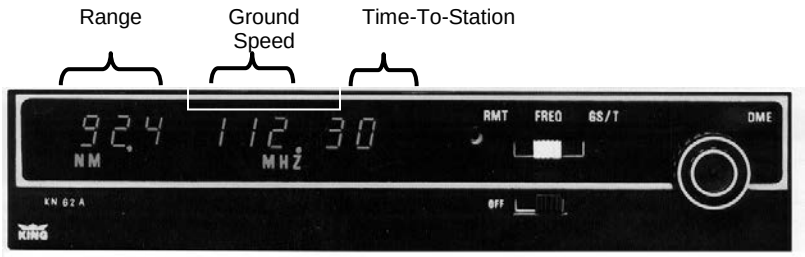
The audio output of the KN 62A can be set as high as 15 milliwatts into 600 ohms using the audio level adjustment accessible through the top cover. It is set for approximately 2mW output at the factory. It is desirable to use the audio to identify the DME ground stations being received.

The effective range of the KN 62A KME depends on many factors; most important being the altitude of the aircraft. When the aircraft is on the ground, the KN 62A usually will not receive DME stations due to line-of-sight signal limitations. Other contributing factors to the DME's effective range are the location and altitude of the ground transmitter, transmitter power output, and the degree of maintenance of the ground facility. The distance measured by the KN 62A is slant-range distance (measured on a slant from aircraft to ground station) and should not be confused with actual ground distance. The difference between ground distance and slant-range distance is smallest at low altitude and long range. These distances may differ considerably when in close proximity to a VOR/DME facility. However, if the range is tree times the altitude or greater, this error is negligible. In order to obtain accurate ground speed and time-to-station, the aircraft must be tracking directly to or from the station.

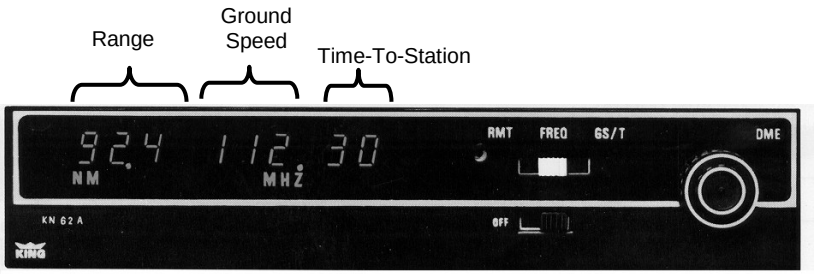


A. Frequency Mode (KN 62A)

Figure 3-1 62A Control Functions



B. Ground Speed/Time-to-Station Mode (KN 62A)



C. Remote Mode (KN 62A)

62A Control Functions

KCS 55A PNI SYSTEM OPERATION INSTALLATION

When power is applied to the KCS 55A System the HDG flag will remain in view until the following conditions are satisfied: The gyro spin motor is at least 50% of normal speed, the fast slave mode has been executed and normal system power is present. The fast slaving mode is initiated when power is applied and is switched to the slow slave mode when the slaving error is reduced to zero. The fast slave rate is 180 degree/minute. The slow slave rate is 3 degree/minute to keep the system aligned with the earth's magnetic field. The slaving meter on the KA 51A/51B indicates relative deviation from this alignment.

CAUTION

MOVEMENT OF THE AIRCRAFT WHEN THE GYRO'S ARE NOT UP TO FULL SPEED OR WHEN POWER TO THE GYRO'S HAS BEEN SHUT OFF AND GYROS HAVE NOT FULLY SPUN DOWN MAY CAUSE GYRO DAMAGE. ALLOW SUFFICIENT SPIN DOWN TIME PRIOR TO ANY AIRCRAFT MOVEMENT.

Set the navigation receiver to the desired VOR/LOC station and rotate the course select knob to adjust the selected course pointer to the desired course radial. When a usable navigation signal is received by the KI 525A the NAV warning flag will disappear from view.

The KI 525A lateral deviation bar represents the selected VOR/LOC course. The relationship of the deviation bar to the symbol aircraft presents the relationship of the selected course to the aircraft.

For an ILS approach, tune the navigation receiver to the desired frequency. For LOC operation the selected course pointer should be set to the inbound localizer course. The glideslope pointer will deflect into view after a 2 to 12 second delay if a usable glideslope signal is received. The glideslope pointer indicates the relative position of the glideslope path with respect to the aircraft.

For LOC operation and ILS front course approach, tune the navigation receiver to the desired frequency, set the pointer to the selected inbound localizer course, and if a usable glideslope signal is received the glideslope pointer will deflect into view. The glideslope pointer indicates the position of the glideslope path with respect to the aircraft the position of the deviation bar with respect to the symbolic aircraft indicates the relative position of the selected course. For backcourse operation set the course pointer to the inbound localizer course. The deviation bar position relative to the symbolic aircraft then represents the position of the backcourse with respect to the aircraft.

Figure 3-2 KA 51/51A Slaving Accessory and Controls

Figure 3-3 KA 51B Slaving Accessory and Controls

If the KI 525A HDG flag appears in view after the system has been operation or will not go out of view after initial power up, one of the following conditions exists and the compass information will not be reliable:

1) The gyro on the KG 102A is not running above 50% of its normal speed

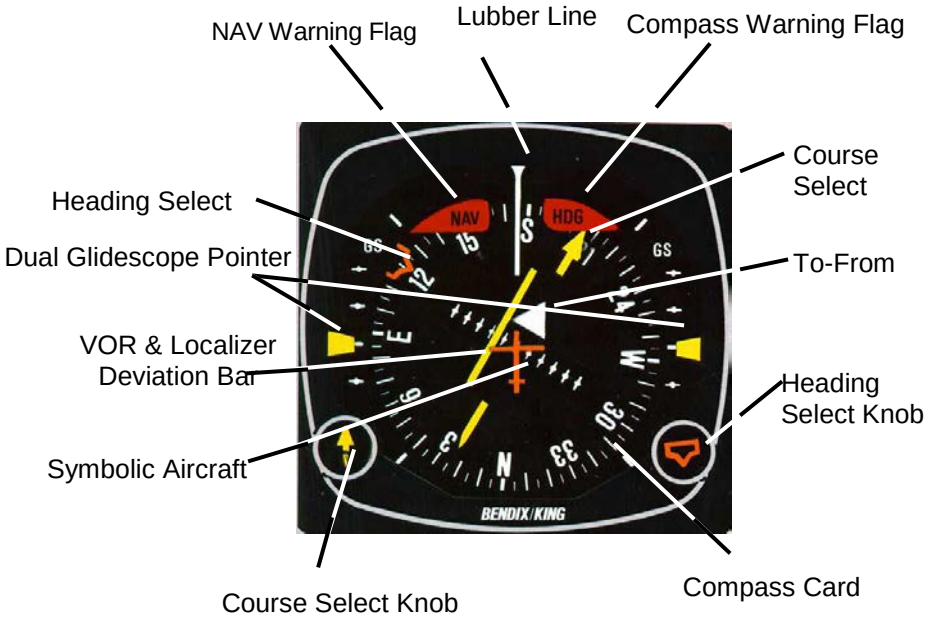
2) The system has not rotated to the magnetic heading and switched out of fast slave on initial power up.

3) The power supply in the KG 102A is not functioning properly.

A continuous large deflection of the slaving meter or large discrepancies between the magnetic compass and the KI 525A compass card may indicate a failure in the slaving system and may not necessarily by annunciated by the HDG flag. If a slaving failure should occur the SLAVE IN button/switch on the KA 51/51A/51B should be returned to its outer position. The system will now be in the free gyro mode. By depressing the clockwise or counter-clockwise button (toggle switch on the KA 51B) on the KA 51/51A the compass dial can be repositioned to the correct heading. The KCS 55/55A will continue to function normally except the heading information will be solely derived from the KG 102/102A Gyro, there will be no magnetic correction from the KMT 112.

If the KI 525A NAV flag appears the navigation equipment is off, improperly tuned, or malfunctioning. If possible switch to another navigation receiver. The compass card on the KI 525A will continue to display the aircraft heading.

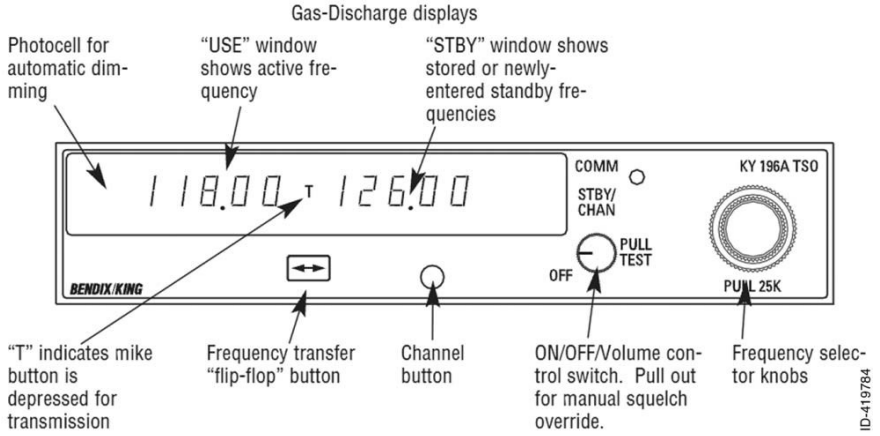
If the KI 525A glideslope pointer remains out of view during ILS operation the glideslope transmitter or the aircraft glideslope receiver is malfunctioning. If possible switch to another glideslope receiver. The localizer and heading displays will continue to function normally.

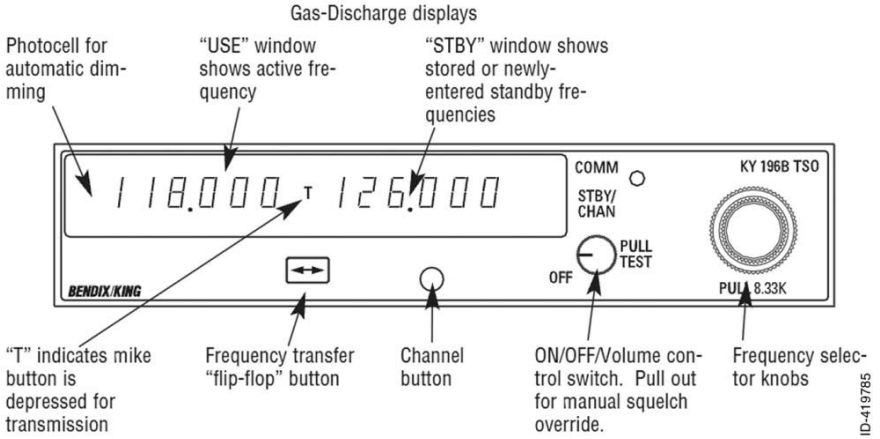


3-1 KI 525A Indicator and Controls

KY 196A, KY 197A and KY 196B VHF Communications Transceivers

KY 196A, KY 197A, AND KY 196B Operation





KY 196B

POWER UP

When you turn the ON/OFF/Volume knob clockwise to the "ON" position, your unit will display the frequencies last used in the "USE" and "STBY" (standby) windows.

To override the automatic squelch, pull the ON/OFF/Volume knob out and, judging by static noise, rotate it to the desired volume level. Push the knob back in to activate the automatic squelch.

NOTE

As with all avionics, the KY 196A, KY 197A, and KY 196B should be turned on only after engine startup. This simple precaution will help protect the solid-state circuitry and extend the operating life of your equipment.

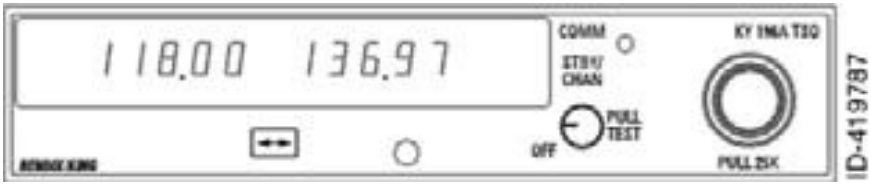
TRANSMITTING

During COMM transmissions, a "T" will appear between the "USE" and "STBY" windows to indicate the keying of the microphone.

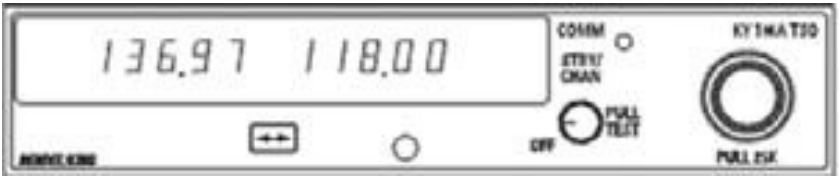
KY 196A/197A FREQUENCY MODE (NORMAL OPERATION)

1. Select a new frequency in the "STBY" window, using the frequency selection knobs. The larger knob controls changes in increments of 1MHz. The smaller knob controls changes in increments of 50kHz when pushed in, and 25kHz when pulled out.

   At the outside limits of the band, the display will "wrap around" to the other end of the band, going from 136MHz to 118MHz.



2. Press the transfer button to activate the new frequency. The newly entered frequency in the "STBY" window flip- flops with the frequency in the "USE" window. This new frequency is now available for use. An optional remote- mounted frequency transfer button may also be used to perform this "flip- flop" function.

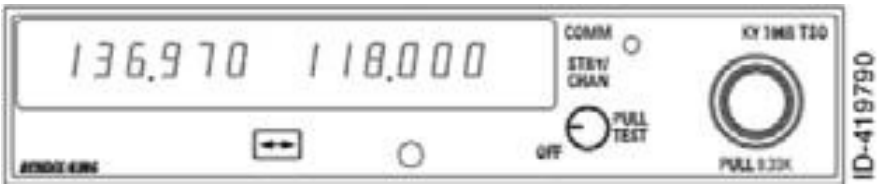


KY 196B FREQUENCY MODE (NORMAL OPERATION)

1. Select a new frequency in the "STBY" window, using the frequency selection knobs. The larger knob controls changes in increments of 1MHz. The smaller knob allows selection of 25kHz frequencies only when pushed in, and both 8.33kHz and 25kHz frequencies when pulled out.

   At the outside limits of the band, the display will "wrap around" to the other end of the band, going from 136MHz to 118MHz.

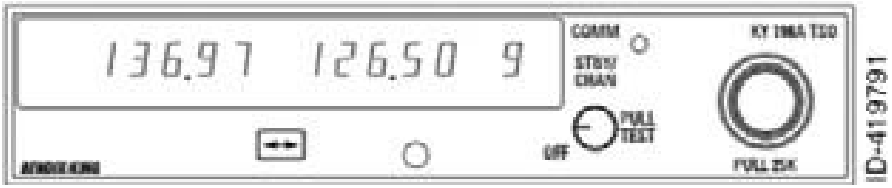
2. Press the transfer button to activate the new frequency. The newly entered frequency in the “STBY” window flip-flops with the frequency in the “USE” window. This new frequency is now available for use. An optional remote-mounted frequency transfer button may also be used to perform this “flip-flop” function.



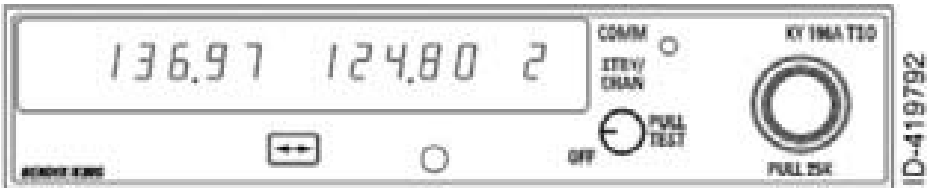
PROGRAM MODE

The Program Mode is used to program frequencies for use in the Channel Mode.

1. Depress the channel (CHAN) button for more than two seconds, until the channel number (to the right of the standby frequency) begins flashing. The most recently used active frequency will remain displayed in the “USE” window.

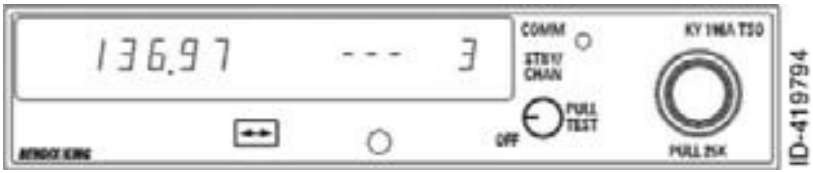


2. Turning either frequency selection knob will change the channel.



3. Once you’ve selected the desired channel number, you may program a new frequency by pressing the transfer button. This will cause the frequency in the “STBY” window to flash. The tuning knobs are now used to enter desired frequency.

4. To program additional channels, push the transfer button again to make the channel number flash, and repeat step three above.



5. If you want to program fewer than nine channels while skipping certain channel numbers, rotate the MHZ frequency knob left or right beyond 136MHz or 118MHz. Dashes (---) will appear in the "STBY" window, indicating that the channel will be skipped when the system is operating in the Channel Mode.

6. To exit the Program Mode, momentarily press the channel button. The unit will also automatically exit the Program Mode if no programming occurs within approximately 20 seconds.

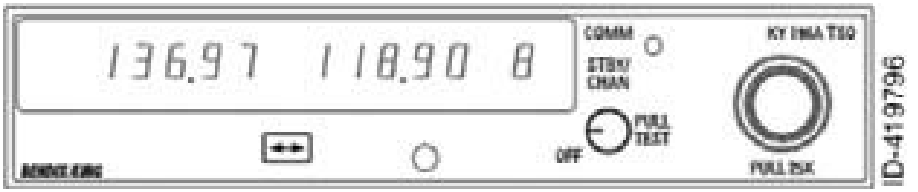
THE PROGRAM-SECURE MODE

The Program Secure Mode may be used to lock a desired frequency to a specific channel number, prohibiting program changes from the front of the unit. Your KY 196A, KY 197A or KY 196B should be taken to your Bendix/King dealer for programming in the Program Secure Mode.

CHANNEL MODE

The Channel Mode is used to recall preset frequencies stored in memory.

1. To enter the Channel Mode momentarily, push the channel button while in the Frequency Mode. The active frequency remains displayed in the "USE" window, and the last used channel number and its associated frequency are displayed in the "CHAN" and "STBY" windows.



If no channels have been programmed, channel 1 automatically disappears and dashes are displayed in the “STBY” window.

2. Turn either frequency selection knob to change the channel number and the channel’s corresponding frequency in the “STBY” window

3. If there is no activity for five seconds, the radio will exit the Channel Mode and return to the Frequency Mode, with the channel frequency remaining in the “STBY” window.

4. You can also return to the Frequency Mode by either:

   a. Pressing the channel button before the five-second delay, in which case the radio recalls the “USE” and “STBY” frequencies prior to entering the Channel Mode, or

   b. Pressing the transfer button, so that the channel frequency becomes the active frequency and the last “USE” frequency becomes the new “STBY” frequency.

NOTE

If the optional remote channel increment switch is installed, each activation of the switch will put the unit in the Channel Mode and advance the channel number from the previous channel used.

DIRECT TUNE MODE

The Direct Tune Mode is entered by pressing and holding the transfer button for longer than two seconds. The "STBY" frequency will disappear and the frequency in the active window can be changed with the frequency selection knobs.

Momentarily pushing the transfer button will return the unit to the Frequency Mode (normal operation). The "STBY" frequency displayed prior to entering the Direct Tune Mode will return unchanged.

DEFAULT MODE

Turning on your KY 196A, KY 197A or KY 196B while pressing the transfer button will bring the unit up in the Direct Tune Mode and install 120.00MHz or 120.000MHz (KY 196B) as the active frequency. This will aid the pilot in blind tuning the radio in the unlikely event of display failure.

DISPLAY ADJUST MODES

To enter the Display Adjust Mode, press and hold the channel button until the Program Mode is entered. Continue holding the channel button while simultaneously pressing and holding the frequency transfer button until "dA 1" replaces the frequency in the "USE" window.

The frequency selector knobs are used to change the value in the "STBY" window. Momentarily pressing the channel button steps the unit through the Display Adjust Modes, "dA 1" through "dA 3". Press the frequency transfer button to exit the Display Adjust Mode.

Display Adjust 1 (dA 1) is used to vary the dim/bright response time to changes in ambient light on the display photocell. The range of values for dA 1 is 1-8, with 1 representing normal.

The normal setting, 1, provides immediate display brightness changes when there are changes in the light falling on the photocell. With dA 1 set to a value of 8, the response time is approximately eight seconds. dA 1 values of 2 through 7 provide intermediate response times.

Display adjustment 2 (dA 2) is used to vary the display brightness when ambient light conditions are less than direct sunlight, such as in a dark cockpit. dA 2 values range from 0-64, with 0 being dimmest and 64 being brightest; the normal dA 2 setting is 20.

dA 3 values range from 0 to 255, with 0 being dimmest and 255 being brightest. This adjustment varies the amount of ambient light required for the display to reach its full dim and bright levels. Normal dA 3 values for a new display range from 0 to 30.

A common use of dA 3 is to adjust the KY 196A, KY 197A or KY 196B display brightness to match the brightness of other radios' displays. Another use is to provide display brightness compensation as the display ages.

KY 196A VHF COMM. TRANSCEIVER OPERATION INSTALLATION

To turn on the radio rotate the Volume (VOL) knob clockwise from the OFF position. When power is activated the Use and Standby (STBY) windows will display the frequencies and/or mode stored in the non-volatile memory before power down.

After activating power, pull the VOL knob out to override the automatic squelch and rotate the VOL knob to the desired audio level. Push the VOL knob back in to activate the automatic squelch.

CAUTION

THE KY 196A SHOULD BE TURNED ON ONLY AFTER ENGINE STARTUP. THIS IS A SIMPLE PRECAUTION WHICH HELPS PROTECT THE SOLID STATE CIRCUITRY AND EXTENDS THE OPERATING LIFE OF YOUR AVIONICS EQUIPMENT.

TRANSMIT INDICATOR

During Comm transmissions, a T will appear between the USE and STBY windows to indicate that the transceiver is in the Transmit mode of operation.

MODES OF OPERATION

A. Frequency Mode

Frequency selection is accomplished in the Standby Entry mode by changing the frequency display in the STBY window of the display with the tuning knobs, and then transferring the selected frequency into the USE window by pressing the Transfer button. The larger tuning knob will increment or decrement the MHz portion of the display in 1MHz steps with roll-over at each band edge (118.000MHz or 135.975MHz). The smaller tuning knob will increment or decrement the KHz portion of the display in 50KHz steps with the knob pushed in or in 25KHz steps with the knob pulled out. While in the Standby Entry mode, the transceiver remains tuned to the frequency displayed in the USE window at all times.

NOTE

Extended Frequency units will roll-over at 118.000 and 136.975 or 139.975MHz.

B. Channel Mode

Momentarily pressing the Channel (CHAN) button while in the Frequency mode puts the radio in the Channel mode. The last active frequency remains tuned and displayed in the USE window. The last used channel number is displayed in the channel digit unless no channels have been programmed, in which case the radio defaults to Channel 1 and dashes are displayed in the STBY window. Turning either tuning knob changes the channel number and corresponding frequency in the STBY window the channels will only increment and decrement to channels that have been programmed. If there has been no activity for five seconds the radio will return to Frequency mode and the channel frequency is placed in the STBY window. Pressing the CHAN button before the five second delay is completed will return the radio to the Frequency mode and the status of the Frequency mode prior to entering Channel mode remains the same.

When in Channel mode, pressing the Transfer button will return the radio to Frequency mode. The channel frequency will become the new USE frequency and the last USE frequency will become the new STBY frequency. If the radio was in Direct Tune mode prior to entering Channel mode, pressing the Transfer button or allowing the radio to time out will bring it back to Standby Entry.

C. Program Mode

The program mode is entered by pressing and holding the CHAN button for longer than two seconds. The last active frequency remains tuned and displayed in the USE window. The last used channel number is displayed when Program mode is entered. The channel number flashes and turning either tuning knob changes the channel number. Pressing the Transfer button will cause the frequency associated with that channel to flash. The tuning knobs then work as in the Frequency mode, except that between the roll-over points (118.XX and 135.XX/136.XX/139.XX) dashes are displayed. These dashes are used to deprogram channels, and to display a channel that is un-programmed. When the channel frequency is flashing, pressing the Transfer button will cause the frequency to stop flashing and the channel number to start flashing at which time a new channel may be selected for programming.

D. Program Secure Mode

Program Secure mode is used to secure or lock the frequency that is assigned to a channel so that the frequency assigned to that channel cannot be changed. All channels or individual channels can be Program Secured. The following list of operations is given to Program Secure or Un-Program Secure a channel:

TO PROGRAM SECURE A CHANNEL:

1. Hold the CHAN button in for more than 2 seconds (Program mode).
2. Momentarily press the Transfer button (flashing frequency).
3. Change channel frequency to desired Program Secured frequency.
4. Ground the Program Secure pin (TP 501).
5. Momentarily press the Transfer button (Flashing channel number).

6. Unground the Program Secure pin.

TO UN-PROGRAM SECURE A CHANNEL:

1. Hold the CHAN button in for more than 2 seconds (Program mode).
2. Ground the Program Secure pin (TP 501).
3. Momentarily press the Transfer button (flashing frequency).
4. Unground the Program Secure pin.
5. Momentarily press the Transfer button (Flashing channel number).

E. Direct Tune Mode

The Direct Tune mode is entered from the Standby Frequency Entry mode or Channel mode by pushing the Transfer button for longer than 2 seconds. The tuning knobs operate as in Standby Frequency Entry, but will change the USE frequency, rather than the STBY frequency. The radio will be tuned to the Active frequency.

Momentarily pushing the Transfer button returns the radio to Standby Frequency Entry. The Standby frequency prior to Active Entry mode remains unchanged.

REMOTE FREQUENCY TRANSFER (optional)

The Remote Frequency Transfer button operates identically to the front panel Transfer button with the exception that holding the Remote Transfer button for two seconds does not place the radio in the Active Entry mode.

REMOTE CHANNEL INCREMENT (optional)

Pressing the Remote Channel button will cause the system to enter the Channel mode of operation and will increment the channel from the previous channel number used.

KY 96A VHF COMM. TRANSCEIVER OPERATION INSTRUCTIONS

To turn on the radio rotate the Volume (VOL) knob clockwise from the OFF position. When power is activated the Use and Standby (STBY) windows will display the frequencies and/or mode stored in the non-volatile memory before power down.

After activating power, pull the VOL knob out to override the automatic squelch and rotate the VOL knob to the desired audio level. Push the VOL knob back in to activate the automatic squelch.

CAUTION

THE KY96A SHOULD BE TURNED ON ONLY AFTER ENGINE STARTUP. THIS IS A SIMPLE PRECAUTION WHICH HELPS PROTECT THE SOLID STATE CIRCUITRY AND EXTENDS THE OPERATING LIFE OF YOUR AVIONICS EQUIPMENT.

TRANSMIT INDICATOR

During Comm transmissions, a TX will appear between the USE and STBY windows to indicate that the transceiver is in the Transmit mode of operation:

MODES OF OPERATION

A. Frequency Mode

Frequency selection is accomplished in the Standby Entry mode by changing the frequency display in the STBY window of the display with the tuning knobs, and then transferring the selected frequency into the USE window by pressing the Transfer button. The larger tuning knob will increment or decrement the MHz portion of the display in 1 MHz steps with rollover at each band edge (118.000MHz or 135.975MHz). The smaller tuning knob will increment or decrement the KHz portion of the display in 50KHz steps with the knob pushed in or in 25 KHz steps with the knob pulled out. While in the Standby Entry mode, the transceiver remains tuned to the frequency displayed in the USE window at all times.

NOTE

Extended frequency units will rollover at 118.00 and 136.975.

B. Channel Mode

Momentarily pressing the Channel (CHAN) button while in the Frequency mode puts the radio in the Channel mode. The last active frequency remains tuned and displayed in the USE window. The last used channel number is displayed in the channel digit unless no channels have been programmed, in which case the radio defaults to Channel 1 and dashes are displayed in the STBY window. Turning either tuning knob changes the channel number and corresponding frequency in the STBY window. The channels will only increment and decrement to channels that have been programmed. If there has been no activity for five seconds the radio will return to Frequency mode and the channel frequency is placed in the STBY window. Pressing the CHAN button before the five second delay is completed will return the radio to the Frequency mode and the status of the Frequency mode prior to entering Channel mode remains the same.

When in Channel mode, pressing the Transfer button will return the radio to Frequency mode. The channel frequency will become the new USE frequency and the last USE frequency will become the new STBY frequency. If the radio was in Direct Tune mode prior to entering Channel mode, pressing the Transfer button or allowing the radio to time out will bring it back to Standby Entry.

C. Program Mode

The Program mode is entered by pressing and holding the CHAN button for longer than two seconds. The last active frequency remains tuned and displayed in the USE window. The last used channel number is displayed when Program mode is entered. The channel number flashes and turning either tuning knob changes the channel number. Pressing the Transfer button will cause the frequency associated with that channel to flash. The tuning knobs then work as in the Frequency mode, except that between the rollover points (118.XX and 135.XX/136.XX) dashes are displayed. These dashes are used to de-program channels, and to display a channel that is un-programmed. When the channel frequency is flashing, pressing the Transfer button will cause the frequency to stop flashing and the channel number to start flashing at which time a new channel may be selected for programming.

D. Program Secure Mode

Program Secure mode is used to secure or lock the frequency that is assigned to a channel so that the frequency assigned to that channel cannot be changed. All channels or individual channels can be Program Secured. The following list of operations is given to Program Secure or Un-Program a channel:

TO PROGRAM SECURE A CHANNEL:

1. Hold the CHAN button in for more than 2 seconds (Program mode).
2. Momentarily press the Transfer button (flashing frequency).
3. Change channel frequency to desired Program Secured frequency.
4. Ground the Program Secure pin (TP 501)
5. Momentarily press the Transfer button (Flashing channel number).
6. Unground the Program Secure pin.

TO-UNPROGRAM SECURE A CHANNEL:

1. Hold the CHAN button in for more than 2 seconds (Program mode).
2. Ground the Program Secure pin (TP 501).
3. Momentarily press the Transfer button (flashing frequency).
4. Unground the Program Secure pin.
5. Momentarily press the Transfer button (Flashing channel number).

E. Direct Tune Mode

The Direct Tune mode is entered from the Standby Frequency Entry mode or Channel mode by pushing the Transfer button for longer than 2 seconds. The tuning knobs operate as in Standby Frequency Entry, but will change the USE frequency, rather than the STBY frequency. The radio will be tuned to the Active frequency.

Momentarily pushing the Transfer button returns the radio to Standby Frequency Entry. The Standby frequency prior to Active Entry mode remains unchanged.

REMOTE FREQUENCY TRANSFER (optional)

The remote Frequency Transfer button operates identically to the front panel Transfer button with the exception that holding the Remote Transfer button for two seconds does not place the radio in the Active Entry mode.

REMOTE CHANNEL INCREMENT (optional)

Pressing the Remote Channel button will cause the system to enter the Channel mode of operation and will increment the channel from the previous channel number use.

KX 155/165 VHF NAV/COMM OPERATION INSTRUCTIONS

All controls required to operate KX 155/165 are located on the unit's front panel.

COMM TRANSCEIVER

Rotate the VOL knob clockwise from the OFF position. Pull the VOL knob and adjust for desired listening level on the noise being produced by the receiver. Push the VOL knob "back in" to actuate the automatic squelch.

The left portion of the digital display readout is allocated for COMM. USE and STANDBY frequencies with a T between them to indicate the TRANSMIT mode of operation. Select the desired operating frequency in the standby display by rotating the increment/decrement knobs either clockwise or counterclockwise. A clockwise rotation will increment the frequency while a counterclockwise rotation will decrement the frequency. The larger knob will change the MHz portion of the "standby" display. At one band-edge (118 or 135MHz) the following 1MHz change will wrap around to the other band-edge. The smaller knob will change the KHz portion of the standby display. It will change in steps of 50KHz when the knob is pushed in, and 25KHz when the knob is pulled out. The wrap around band-edge is also utilized when incrementing or decrementing the KHz portion of the "standby" display.

To tune the radio to the desired operating frequency, the desired frequency must be entered into the standby display and then the transfer button must be pushed. This will trade the contents of the active and standby display. The transceiver is always tuned to the frequency appearing in the USE display. It is therefore possible to have two different frequencies stored in the USE and STANDBY displays and to change back and forth between them at the simple push of the transfer button. During the transmit mode of operation, a T will appear between the USE and STANDBY displays, signifying that the transceiver is in the transmit mode of operation.

A non-volatile memory stores the COMM USE and STANDBY frequencies on power down. When the unit is turned on again, the COMM USE and STANDBY windows will display the same USE and STANDBY frequencies that were displayed before power down. If an invalid frequency is detected in the memory on power up the COMM USE and STANDBY windows will contain "120.00" thus indicating the presence of an error in the stored frequency.

NAV RECEIVER

The right potion of the display is allocated to NAV receiver USE and STANDBY/RAD information. The frequency channeling is the same as the COMM when operating in the frequency mode. The NAV increment/decrement knob is located on the right hand side of the front panel. The larger knob operates in 1 MHz steps and increments/decrements the STANDBY/RAD frequency display. The smaller knob operates in 50KHz steps. The NAV receiver's lower and upper frequency limits are 108.00MHz and 117.95MHz. Exceeding the upper limit of frequency band would automatically return to the lower limit and vice versa.

NOTE

Only KX 165 has standby/RAD window; KX 155 has standby window only and will not give radial information.

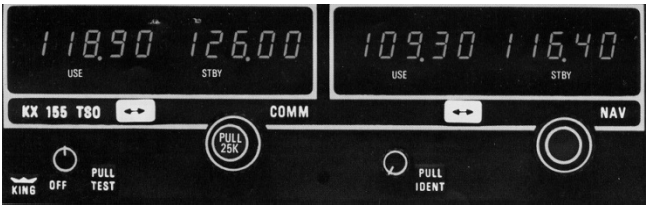
On the KX 165, when the smaller knob is pulled out, the VOR bearing is digitally displayed in STANDBY/RAD window. In the bearing mode, the increment/decrement knob channels the USE frequency window and depressing the frequency transfer button will cause the USE frequency to be placed in blind storage and the STANDBY frequency (in the blind storage) to be displayed in the USE window display. In radial mode of operation, the right hand window of NAV display shows the bearing FROM the station and when due to weak signals the warning flag is activated, a digital flag "--- will be displayed in the radial window. Also, when an ILS frequency is selected, the digital flag "---s displayed in the radial window.

The NAV USE and STANDBY frequencies are stored in the memory on power down and return on power up. On power up, if an error is detected in the stored frequencies, the unit will display 110.00MHz in both USE and STANDBY/RAD windows. The unit does not store the VOR bearing on power down.

When the smaller increment/decrement knob is pushed in, depressing the NAV TRANSFER button will interchange the USE and STANDBY/RAD frequencies. The NAV IDENT knob is active in the pulled out position so that both voice and ident can be heard. When this knob is pushed in, the ident tone is attenuated. The volume of voice/ident can be adjusted by turning this knob.

NOTE

If dual NAV's are installed a placard will be located on the receiver and on the corresponding NAV indicator to correlate the NAV receiver with the appropriate NAV indicator.



KX 155

KX 165

KX 155/165 Control Function

KX 155A VHF NAV COMM OPERATION INSTRUCTIONS

Detailed operation is described in the "Bendix/King Silver Crown Plus Avionics Systems Guide" (Allied Signal P/N 006-18110-0000), which must be immediately available to the flight crew. Some highlights from this pilot's guide also appear among the following suggestions.

COMM Transceiver

Rotate the "PULL TEST" volume control knob clockwise from the OFF position. Pull this knob out and adjust for desired listening level. Then, push the knob back in to actuate the automatic no signal noise squelch, or pull it to get maximum receiver sensitivity.

The left portion of the digital display readout is for COMM ACTIVE and STANDBY frequencies, with a "T" between them to indicate when the transmitter is being keyed, or an "R" to indicate reception of a signal strong enough to open the squelch gate (or TEST knob is pulled).

The outer knob will change the MHz portion of the display. The inner knob will change the kHz portion of the display in steps of 50kHz, when the knob is pushed in, and 25kHz, when the knob is pulled out.

There are three methods of tuning KX155A COMM frequencies, controlled by the COMM frequency transfer button and "CHAN" channel select button:

Pressing the COMM frequency transfer button for more than two seconds will switch to direct active frequency tuning. Later, touching the frequency transfer button (or the CHAN button) will switch to the more familiar two frequency display, where the frequency select knobs tune only the standby frequency display. Then, the frequency transfer button is used to trade the contents of the active and standby displays.

The third method is to press the CHAN button for more than two seconds, to program in (up to 32) preset channel frequencies ("PG" will appear below the COMM standby frequency, and a flashing display can be changed with the tuning knobs). Then, pressing the COMM frequency transfer  button will toggle between changing channels or changing their preset frequencies. If dashes (displayed when rotating the outer knob between 136MHz and 118MHz) are entered instead of a frequency, the corresponding channel is skipped in channel selection mode. Pressing the CHAN button again will then save the programmed channel/frequency associations and exit the channel switching mode. Now, pressing the CHAN button (briefly) will allow changing the COMM standby frequency display quickly, with either of the COMM frequency tuning knobs. The unit will automatically exit the channel mode, with the displayed channel frequency remaining in the STANDBY window, if no different channel is selected within 5 seconds after entering the channel selection mode. Channel frequency selection mode will also switch off, if there is no button or knob activity for 20 seconds. At turn "OFF," all three last shown frequency displays are remembered (ACTIVE and STANDBY and which channel), for next power turn "ON."

The unit has a stuck microphone alert feature. If the microphone is keyed continuously for greater than 33 seconds, the transmitter stops transmitting and the active Comm frequency flashes, to alert the pilot of the stuck microphone condition.

Pilot Configuration

This mode can be accessed by pressing and holding the NAV "MODE" button for more than 2 seconds, and then also pressing and holding the NAV Frequency Transfer  Button, for an additional 2 seconds while continuing to hold the MODE button, until "SWRV" is displayed (under the unit software revision level), instead of a NAV display. Then, let up the transfer and MODE buttons. Display brightness and sidetone volume adjustment functions can then be stepped through by pressing the MODE button. The pilot may then use the NAV frequency knobs to adjust the display minimum brightness, or sidetone volume level. Minimum Brightness (BRIM) will have a range of 0 (the dimmest) to 255 (the brightest). Sidetone volume level is adjusted when SIDE is displayed, from 0 (lowest) to 255 (loudest). Subsequent presses of the MODE button sequences through SWRV, BRIM, SIDE, and then back to SWRV. Momentarily pressing the Nav Transfer  Button exits Pilot Configuration mode. The NAV returns to its previous display, with the new brightness and sidetone levels stored in nonvolatile memory.

NAV Receiver

The right half of the display is used for NAV receiver information. Please use the "MODE" button to step through the NAV displays until the letters "ET" appear at the right end of the display. Then press MODE once more and press the NAV  transfer button once.

The NAV receiver has **five modes** of operation. The operator can step through the following five modes by pressing the MODE button:

The first mode is the familiar two frequency NAV receiver that operates in conjunction with a remote Course Deviation **I**ndicator with Omni Bearing Selector knob, or HSI with course arrow. In this mode, the frequency selector knobs tune the STANDBY frequency display, for later transfer to the ACTIVE display, by pressing the NAV  transfer button. (The last STANDBY frequency is also remembered, in the other four modes, so it can still be  transfer button traded with the ACTIVE frequency, even when the standby frequency is not visible.)

Pressing and holding in for two seconds the NAV  transfer button converts this mode to DIRECT TUNE with a single (active) display. Then, pressing the NAV transfer button (briefly) converts back to the familiar two frequency, tune standby and transfer (like the COMM side).

The NAV receiver second mode replaces the STANDBY frequency display with a NAV station omni bearing. The NAV tuning knobs now directly tune the still visible ACTIVE frequency. However, pulling the small NAV tuning knob causes it to work for an omni bearing selector, in conjunction with the complete course deviation indicator (including "to" or "from" pointer) that now appears at the bottom of the NAV display. A vertical OBS flashes in the middle of the display, to show when the small tuning knob is pulled out for use as an omni bearing selector. Pressing the NAV  transfer button now trades NAV frequencies between the visible ACTIVE display and the invisible STANDBY memory.

The NAV receiver third mode replaces the STANDBY frequency display with the bearing TO the NAV station, and the NAV tuning knobs now directly tune the still visible ACTIVE frequency.

The NAV receiver fourth mode replaces the STANDBY frequency display with the radial FR(om) the NAV station, and the NAV tuning knobs now directly tune the still visible ACTIVE frequency.

The NAV receiver fifth mode replaces the STANDBY frequency display with an Elapsed Time counter that has been counting minutes and seconds since the receiver was turned on. Pressing and holding in for over two seconds the NAV  transfer button resets the time counter to zero and causes a displayed "ET" to flash. Now, there are two choices. Either use the NAV tuning knobs to dial in a chosen count down time, and then start the count down by pressing the NAV  transfer button, or use the NAV  transfer button to restart the timer to again count up from zero. (Pull the tuning knob for single seconds.) As a count down timer, when the display reaches zero, the display will continue on, as a count up timer, which flashes for the first 15 seconds after passing zero. If the optional alerter is connected, it will sound, as the count crosses zero.

Pressing the MODE button starts over with the first mode, remembering whether the operator had chosen to view two frequencies or direct tune one. Actually, there is not really a number one mode because this receiver always just restarts from where it was when last turned off.

The NAV IDENT knob is active in the pulled out position so that both voice and ident can be heard. When this knob is pushed in, the ident tone is attenuated. The volume of voice/ident can be adjusted by turning this knob.

GNC 250/250XL COMM/GPS

GNC 250 COMM/GPS

GNC 250XL

Detailed operation is described in the GARMIN GNC-250 Pilot's Guide (Garmin P/N 190-00067-50, Rev. A or later) or GARMIN GNC-250XL Pilot's Guide (Garmin P/N 190-00067-60, Rev. A or later), which must be immediately available to the flight crew. The GNC 250/250XL display top line is the ACTV (active) and STBY (standby) COMM frequencies, and the lower three lines are the GPS display. This GPS is for VFR use only.

This COMM works as soon as the OFF/ON/Volume control knob is turned ON; right beside this knob is the SQ control key, you can press it for MAXIMUM receiver sensitivity. The double ended ↔ arrow key (above the CRSR cursor key) is used to trade the ACTV (active) and STBY (standby) frequencies. Only the STBY frequency may be changed, by the knobs beside the CRSR key, and only when the CRSR key has been pressed the correct number of times to highlight the STBY frequency. Pressing the double arrow key for more than two seconds will always tune the active frequency to 121.50MHz (emergency). A "TX" will show up to the right of the active frequency, during transmit. The GNC 250/250XL will not transmit continuously for longer than 35 seconds, even with a stuck mic key.

If there is a flashing light beside the MSG key, and/or the instrument panel mounted "GPS MESSAGE" light is on, press the GNC 250/250XL MSG (message) key once, to read the message, and again, to return to the previous display. ENTer = "yes" to "OK?" Press the D arrow "direct to" key and use the right side knob (and ring) to spell out a chosen way point (remember that ICAO says to start USA all letter airport identifiers with "K"); then, press ENT twice, to navigate directly there. Use CRSR and ring knob to highlight what you want to change. ENT will transfer a highlighted frequency to STBY. Press NRST (nearest airport, etc.) key and twist knobs to get quick selections. D arrow and ENT takes you there. See GNC 250 or GNC 250XL Pilot's Guide for more instructions.

GARMIN GPS 150 NAVIGATION SYSTEM

Detailed operating instructions can be found in the (GARMIN P/N 190-00048-00) GPS 150 Pilot's Guide that must be immediately available to the flight crew. Some highlights of that pilot's guide are printed here.

After equipment turn on and its self test, it is necessary to press the ENT key to answer "yes, I approve that," any time the GPS 150 display includes the flashing question "OK?"...the operator may wish to first use the CRSR (cursor) key and twist the concentric knob and ring, to change something. The GPS 150 receiver has a message annunciator that lights up beside the STAT key, that controls it. Waypoint arrival, change of receiver status, and other important GPS messages light this light. There is also mounted on the instrument panel a remote "GPS MESSAGE" indicator, with push to test (its own lamp) function. IF there is a flashing light beside the STAT key, repeated by the instrument panel mounted "GPS MESSAGE" light, press the GPS 150 STAT (status message) key once, to read the message, and again, to return to the previous display. Press the D arrow "direct to" key and use the right side knob (and ring) to spell out a chosen way point (remember that ICAO says to start USA all letter airport identifiers with "K"); then, press ENT twice, to navigate directly there. Use WPT (waypoint), CRSR (to select a displayed word), and concentric ring and knob to make choices or enter location of user defined destination waypoints. Or, press NRST (nearest) key and twist ring and knob to get quick waypoints. D arrow and ENT will take you to a CRSR highlighted waypoint.

See Section VI for weight and balance information.

GARMIN GPS 150XL NAVIGATION SYSTEM

Notice the placard stating "GPS limited to VFR use only".

Detailed operating instructions can be found in the (GARMIN P/N 190-00067-80) GPS 150XL Pilot's Guide and Reference that must be immediately available to the flight crew. Some highlights of that pilot's guide are printed here.

After equipment turn on and its self test, it is necessary to press the ENT key to answer "yes, I approve that," any time the GPS 150XL display includes the flashing question OK?"...the operator may wish to first use the CRSR (cursor) key and twist the concentric knob and ring, to change something. The GPS 150XL receiver has a message annunciator that lights up beside the MSG (message) key, that controls it. Waypoint arrival, change of receiver status, and other important GPS messages light this light. There is also mounted on the instrument panel a remote "GPS MESSAGE" indicator, with push to test (its own lamp) function. IF there is a flashing light beside the MSG key, repeated by the instrument panel mounted "GPS MESSAGE" light, press the GPS 150XL MSG key once, to read the message, and again, to return to the previous display. Press the D arrow "direct to" key and use the right side knob (and ring) to spell out a chosen way point (remember that ICAO says to start USA all letter airport identifiers with "K"); then, press ENT twice, to navigate directly there. Use WPT (waypoint), CRSR (to select a displayed word), and concentric ring and knob to make choices or enter location of user defined destination waypoints. Or, press NRST (nearest) key and twist ring and knob to get quick waypoints. D arrow and ENT will take you to a CRSR highlighted waypoint. Up and down arrow keys beside "OFF" knob change the map scale, when NAV key is pressed to moving map.

See Section VI for weight and balance information.

GNS 430COMM//NAV/GPS

Detailed operation is described in the GARMIN GNS 430 Pilot's Guide and Reference (Garmin P/N 190-00140-00, Rev. A or later), which must be immediately available to the flight crew. A 16 page abbreviated GNS 430 Quick Reference reminder (Garmin P/N 190-00140-01, Rev. B or later) is also available. The following cursory instructions are for VFR USE, ONLY.

The COMM works as soon as the C(omm) PWR/VOL volume control knob is turned ON. After turn ON, the pilot will only be able to see and adjust which frequencies are presently selected, by pressing the GPS ENT key(twice), to approve the GPS Aviation Database effectivity page, displayed after the turn ON self test display page. The "C" knob is also the squelch control key...you can press it for unsquelched MAXIMUM receiver sensitivity. The first 2.3" of the left hand side of this radio functions as a conventional VHF "NAV/COMM," and the rest of the radio (center and right hand side) functions only as a GPS navigation receiver, with moving map display. The double ended arrow ↔ key marked "C" is used to trade the COMM active and standby frequencies. Pressing this key for more than two seconds will always automatically tune the COMM transceiver ACTIVE frequency to the 121.500 emergency frequency. Only the standby frequencies may be changed by the COM/VLOC knob and ring. An “RX” will show up beside the letters "COM" above the active frequency, while receiving a transmission. A “TX” will show up above the active frequency, during transmit. The GNS 430 will not transmit continuously for longer than 35 seconds, even with a stuck mic key.

Please call the large knob at the lower left corner of the GNS 430 the "COM ring," and please call the small knob in its center (PUSH C/V) the "COM knob."

Also, please call the large knob at the lower right corner of the GNS 430 the "GPS ring," and please call the small knob in its center (PUSH CRSR) the "GPS knob." The COM knob and ring tune the highlighted COMM standby frequency, on the second line down, below the letters "COM." Pushing in on the COM knob shifts the frequency highlight below "VLOC" (VOR/LOC/ILS), and the knob and ring then tune the VLOC standby frequency. Pushing the COM knob (PUSH C/V) toggles the tuning control (and cursor highlight) between COM and VLOC frequencies. However, this control always defaults back to COM, after the COM knob or ring has not been turned for the past 30 seconds. The double ended arrow ↔ key marked "V" is used to trade the VOR or ILS active and standby frequencies. The little knob marked "V" is for VOR or Localizer or ATIS volume; push this knob to hear the VOR or LOC Morse code identifiers and see "ID," by the "VLOC" frequencies.

There are only two functional connections between the COMM/NAV and the GPS sides of the GNS 430. One function is through the CDI button, at the lower left edge of the GNS 430. The GNS 430 is normally connected to an HSI or other remote navigation Course Deviation Indicator, and the "CDI" button selects whether this indicator will be supplied with "VLOC" (VOR or LOC) deviation from the left side of the GNS 430, or "GPS" deviation from the right side of the GNS 430. This choice is indicated, just above the CDI button.

The other connection is that if a COMM or NAV frequency on a GPS page is cursor highlighted (push the GPS "PUSH CRSR" knob), and the ENT button is pressed, this frequency is then transferred to the standby register of the COM or VLOC frequency display. VOR/LOC left/right is never displayed on the GNS 430.

If there is a yellow flashing "MSG," above the MSG key, press the MSG (message) key once, to read the message, and again, to return to the previous display. After first turn "ON" and ENT approval of the Aviation Database effectivity page, the next GPS page to appear will be the satellite STATUS page, while the receiver is looking for satellites (NAV page number 5). As soon as the GPS is ready to navigate, the display switches to the moving map (NAV page number 2). NAV is the first of four groups of pages that may be displayed after turning the GPS ring fully counter clockwise (NAVIGATION, WAYPOINT, AUXILLARY or NEAREST). Which group of pages is displayed just above the FPL button, and the little boxes to the right fill in to show which page of that group is being displayed. The GPS knob selects which page in that group will be displayed.

Turn the GPS ring to select which type of pages. Then, turn the GPS knob, to select your desired page. Then, push PUSH CRSR (the GPS knob), to use the ring for scrolling up or down that page. To get emergency NEAREST AIRPORT, turn the GPS ring fully clockwise (three or more detent clicks) and then turn the GPS knob (many detent clicks) fully counter-clockwise, if necessary, to see the nearest airports (NRST page number one). Then, push the GPS (PUSH CRSR) knob, to get a cursor. Use the GPS ring to scroll the cursor through the nearest airports and their tower (or common traffic advisory) frequencies. First use the ENT key to transfer your chosen twr (or uni or mul) frequency to the COMM. Then, use the ring to scroll to the airport identifier and use the D arrow key and ENT key (twice) to navigate directly there.

At any time, press the D arrow "direct to" key and use the GPS knob and ring to spell out a chosen way point (remember that ICAO says to start USA all letter airport identifiers with "K"); then, press ENT twice, to navigate directly there. Pressing the OBS button allows the pilot to navigate along any chosen bearing to (or radial from) the waypoint, like using the omni bearing selector for a VOR. Press the CLR button for more than two seconds to default to NAV page one. NAV page one has (only) a GPS course deviation indicator that can be repeated on a remote CDI or HSI, by pressing the CDI button. The NAV 2 page is a moving map. The left and right ends of the top GPS (RNG) button select the moving map's range, between 500' and 2000 miles. The CLR button removes up to three levels of additional map details. Use the MENU button (and ENT key) to choose to display a larger map, or a small map with waypoint bearing and distance and ground speed data along one side.

SECTION II

WEIGHT AND BALANCE

At the time of delivery, Sikorsky Aircraft Corporation provides each rotorcraft with an original weight and balance report and the equipment list, (equipment both required and optional) installed on the helicopter at the time of licensing. The removal or addition of any equipment can affect the basic empty weight and center of gravity. Any change to the permanently installed equipment or modification which affects weight or moment must be entered in a revised weight and balance record.

GNC 250, GNC 250XL, GPS 150, GPS 150XL, GNS 430

The removable panel unit for GNC 250 weighs 2.4 lbs. and is located at longitudinal arm 57.5" in the standard instrument panel.

The removable panel unit for GNC 250XL weighs 2.6 lbs. and is located at longitudinal arm 57.8" in the standard instrument panel.

The removable panel unit for GPS 150 receiver weighs 2.1 lbs. at 55.5" aft (for a main instrument panel, or 59.7" for a lower instrument panel).

The removable panel unit for GPS 150XL receiver weighs 1.7 lbs. at 56" aft (for a main instrument panel, or 60.2" for a lower instrument panel).

The removable panel unit for GNS 430 receiver weighs 5.1 lbs. at 53.1" aft (for a main instrument panel, or 59.1" for a lower instrument panel).

SECTION III

SUPPLEMENTAL PERFORMANCE DATA

None.

SECTION IV

AIRCRAFT HANDLING, SERVICING, AND MAINTENANCE

None.