

## INS 429 navigation system

### EQUIPMENT DESCRIPTION

The INS 429 has been designed for simplicity. It will provide the pilot with simple easy to interpret navigation information for in-route VOR and ILS Approach. The INS 429 can also be coupled to an external GPS system and display the GPS course deviation.

The INS 429 also has an enhanced display that features both active and standby frequency displays. A display that shows the pilot the type of station that is selected as active, be it a VOR or an ILS. Also continually displayed is the selected radial.

Other display features include a three light marker and a back course indicator. The course deviation indicators are displayed as a dot matrix array that is easily interpreted by the flight crew. The display incorporates the latest is high intensity LED technology which provides excellent view ability even in direct sunlight.

The unit's controls have been designed for simple user interface. The concentric knobs on the left side of the unit select the standby frequency with a push button flip-flop to load the standby frequency into the active window. The concentric knobs on the right side of the unit select the desired radial. The push button on the right side knob set lets the user flip-flop the selected radial 180°. A long push of the right button will produce the centered radial from the selected station.

The INS 429 has three internal receivers. The VOR/LOC receiver operating from 108.00 MHz to 117.95 MHz, the Glide Slope receiver which operates from 329.15 MHz to 335.0 MHz, and the Marker receiver operating at 75 MHz. The INS 429 also has an external mode. The external mode is selected as a frequency as described above. In external mode the INS 429 can be used as a standard NAV Indicator and coupled to an external NAV or GPS receiver via the rear connector.



**This section will provide detailed operating instructions for your new INS 429 Integrated Navigation System. Please read this section completely to become familiar with all of the features of the unit.**

## SCOPE

This section will provide detailed operating instructions for your new INS 429 Integrated Navigation

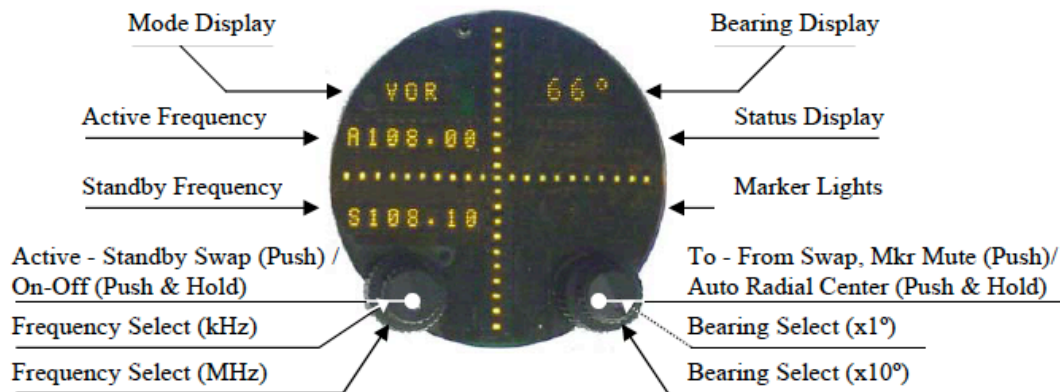


Figure 1: Unit Controls

## DISPLAY FUNCTIONS

The **Mode** display will change automatically in conjunction with the frequency that is loaded into the active frequency position. “**VOR**” will appear if a VOR frequency is loaded and “**ILS**” will appear if an ILS frequency is loaded. When “**EXT**” is loaded in the active position, the mode display will display “**XVOR**”, “**XILS**” or “**XGPS**” depending on the type of device that is connected to the external inputs at the rear connector of the INS 429.

The **Bearing** and **Status** displays are contained in the upper right quadrant of the INS 429. The bearing (or radial) will be displayed at all times in the top (**Bearing**) display and either “**TO**”, “**FROM**”, or “**BKCS**” in the lower (**Status**) display. If the unit is not receiving a valid VOR signal the lower display will be blank and the CDI display will be flagged.

The unit displays a flagged condition by showing full deflection of dots in both directions. In the case of a horizontal flag (VOR / Localizer), the CDI will show a horizontal bar indicating a flag. In the case of a vertical flag (Glide Slope), the VDI will show a vertical bar indicating a flag.

The marker receiver is always operational and the marker lights are located horizontally in the lower right quadrant of the unit’s display..

## User Controls

Refer to Figure 1: Unit Controls. The user controls consist of two sets of concentric rotary knobs. The set on the left control functions on the left side of the display and the set on the right control the functions on the right side of the display. Both sets of knobs contain three parts, the inner knob (the small one) the outer knob (the large one) and a momentary push button (the end of the small knob).

### ***TURNING THE UNIT ON/OFF***

To turn the unit on, momentarily press the left hand inner knob. The unit will go through a short initialization routine at start up and then begin operation at the same settings that were loaded at the last power down. To turn the unit off, press and hold the left inner knob for three seconds.

### ***SETTING ACTIVE AND STANDBY FREQUENCY***

The knob functions of the left hand set are as follow; the inner knob will change the frequency by KHz or the numbers to the right of the decimal point (108.15) in 50kHz increments. The outer knob will change the frequency by MHz or the numbers to the left of the decimal point (108.15) in 1 MHz increments. Only the frequency in the standby position will change. The standby frequency is displayed at the bottom on the left side of the display and is identified by the letter "S" to the left of the frequency (S108.15). To load the standby frequency in to the active position, momentarily press on the inner knob. This will swap the standby frequency with the active frequency. The active frequency is identified by the letter "A" at the left of the frequency display (A108.15). If the external inputs are active (configured in the setup pages see section 3.2.1.3 on pg. 13) "EXT" will appear in the standby frequency position while rotating the outer knob. "EXT" is located between "117.XX" and "108.XX".

"EXT" stands for *external* as in external function. "EXT" can be loaded into the active display position by momentarily pressing on the inner knob. When "EXT" is loaded into the action position the INS 429 will display CDI and VDI information from an external receiver source such as an external GPS or an external NAV.

### ***SETTING A BEARING***

The knob functions on the right side of the unit are as follow; the inner knob changes the bearing display by 1° increments. The outer knob changes the bearing display by 10° increments.

### ***TO/FROM SWAP AND AUTO RADIAL CENTERING***

When "VOR" is displayed in the mode display, momentarily pressing the inner right knob will change the displayed bearing to the 180° reciprocal. Pressing and holding the inner knob for three seconds will change the bearing to the centered "FROM" radial of the received VOR station.

### ***SELECTING THE BACKCOURSE***

When ILS is displayed in the mode display pressing and holding the right inner knob for three seconds will enable the ILS in the back course mode and "BKCS" will be displayed in the Status display. While in the back course mode the glide slope VDI display will be flagged.

Pressing and holding the right inner knob again for three seconds will return the ILS to the *standard display mode*.

### ***CHANGING THE VOLUME***

The receiver's audio volume is controlled by momentarily pressing both of the inner knobs at the same time. "VOL" will be displayed in the standby frequency display and the volume level is indicated by the numeric value after "VOL" (i.e. "VOL 15"). The volume level can be adjusted from 0 to 20 by rotating the left hand large knob. Normal display operation resumes after 5 seconds or by pushing both knobs at the same time.

### ***MARKER MUTE***

When the unit is selected to an ILS frequency and is displaying "ILS", the marker receiver's audio can be muted for 1 minute by momentarily pressing the right button. This does not function on VOR frequencies.

## **System Configuration**

### **ACCESSING SETUP FUNCTIONS**

During startup, the unit's setup can be assessed by pressing both buttons simultaneously until the unit's Mode display shows "**CONF**". In this mode, the marker volume, marker mix, and external interface enable can be configured. To select each individual setting, rotate the right outer knob until the Active Frequency display and Standby Frequency display show the desired setting. To exit this mode and resume normal operation, press both buttons simultaneously.

### ***MARKER VOLUME***

When the Active Frequency display shows "Marker", and the Standby shows "Vol", the marker volume can be adjusted by rotating the right inner knob. The settings range between 5 and 20 in accordance with FAA regulation.

### ***Marker Mix***

When the Active Frequency display shows "Marker", and the Standby shows "Mix", the marker mix function can be turned on and off. This function allows for the VOR/Localizer audio output (Pin 33) to also contain the Marker audio signal. "On" mixes the audio onto that one line, "Off" separates the audio to their separate lines as indicated on the wiring diagram.

### ***EXTERNAL MODE***

When the Active Frequency display shows "Extern", and the Standby shows "Mode", the external mode function can be turned selected. When this function is "Off", the frequency selection will rollover from 117 MHz to 108 MHz with no "Ext" shown in the frequency display. This setting is typical for an installation that does not utilize the External Navigation inputs. "Anl" selects the analog inputs and enables the "Ext" selection in the frequency display.

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### MAINTENANCE INSTRUCTIONS

Maintenance of the INS 429 Integrated Navigation System is on condition only. **No periodic maintenance is required.** VOR calibration, in accordance with 14 CFR 91.171, is required to be checked every 30 days. If unit is found to be out of calibration, send unit in for service. If unit is removed for service, upon re-installation perform Post Installation check as described in section 2.4 of installation manual.