

## KLN 89(B) Pages

### Airport (APT) Pages

- 1 Ident, elevation, name, city, state, use type
- 2 Latitude/longitude, bearing/radial and distance
- 3 Time from UTC, fuel, approaches, radar environment
- 4 Runway numbers, length, surface, lighting
- 5 Comm frequencies
- 6 User remarks
- 7 SID/STAR procedures
- 8 Non-precision approach procedures

### VOR Pages

- 1 Ident, frequency, name, lat/long
- 2 Magnetic station declination, bearing/distance

### NDB Pages

- 1 Ident, frequency, name, lat/long
- 2 Bearing/distance

### Intersection (INT) Pages

- 1 Ident, lat/long, bearing/distance
- 2 Location relative to VOR

### User-defined Waypoint (USR) Pages

- 1 Ident, lat/long, bearing/distance
- 2 Location relative to VOR

### Active Waypoint (ACT) Pages

Waypoint pages for active flight plan waypoints and/or the direct-to waypoint

### Navigation (NAV) Pages

- 1 Active waypoint/leg, CDI, DTK, TK, bearing, ETE
- 2 Present position (lat/long or radial/distance)
- 3 Present time, departure time, ETA at destination, elapsed flight time
- 4 Moving map

### Flight Plan (FPL) Pages

- 0 Active flight plan
- 1-25 Stored (numbered) flight plans

## Bendix/King® GPS Navigation System

### Calculator (CAL) Pages

- 1 Trip calcs for distance, bearing, ESA, and ETE
- 2 Trip calcs for fuel requirements
- 3 Alarm/timer
- 4 Pressure altitude
- 5 Density altitude
- 6 True airspeed (TAS)
- 7 Winds aloft
- 8 Sunrise/sunset

### Setup (SET) Pages

- 1 Position initialization for GPS receiver
- 2 Date, time, and time zone initialization
- 3 Data base update
- 4 Turn anticipation enable/disable
- 5 Default first waypoint character
- 6 Nearest airport criteria
- 7 SUA alert enable/disable
- 8 Barometric pressure units
- 9 Altitude alerting
- 10 Low voltage warning
- 11 Display brightness

### Other (OTH) Pages

- 1 GPS state, GPS altitude, EPE
- 2 GPS signal status
- 3 RAIM prediction
- 4 List of user-defined waypoints
- 5 List of airports and user waypoints with stored remarks
- 6 Software versions
- 7\* Fuel required, on board
- 8\* Fuel endurance, range, efficiency
- 9\* Fuel flow
- 10\* Cumulative fuel used
- 11\* TAS, Mach
- 12\* SAT, TAT, pressure alt, density alt

\* Page only displayed if appropriate equipment is interfaced with KLN 89(B)

# KLN 89B INSTRUMENT APPROACH REFERENCE

**WARNING: Make sure that you have practiced instrument approaches with the KLN 89B in VFR weather before attempting to fly approaches in IMC.**

## A. APPROACH SEQUENCE

1. Flight Plan
  - a. **SELECT** an approach from the APT 8 page.
  - b. **CHANGE** or **DELETE** approaches on the FPL 0 page.
2. Get established on the final approach course.
  - a. **VERIFY APR ARM** is annunciated within 30 nm of destination.
  - b. **SELECT** the NAV 4 page.
  - c. **SELECT** OBS mode for radar vectored intercepts, procedure turns and holding patterns. Use OBS mode until inbound to the FAF.
  - d. **SELECT** LEG mode for NoPT routes including DME arcs. LEG mode is mandatory from the FAF to the MAP.
3. At or before 2 nm from the FAF inbound:
  - a. **SELECT** the FAF as the active waypoint.
  - b. **SELECT** LEG mode.
4. At 2 nm inbound to the FAF:
  - a. **VERIFY APR ACTV** annunciated.
5. At the FAF if APR **ACTV** not annunciated:
  - a. **DO NOT DESCEND.**
  - b. **EXECUTE MISSED APPROACH.**

**NOTE:** *There is no automatic leg sequencing at the MAP.*

6. After the MAP:
  - a. **FLY** the exact published missed approach procedure from the approach charts.
  - b. **PRESS** ■■■. Verify automatic selection of the first waypoint of the missed approach procedure (usually the missed approach holding point). Change it if desired.

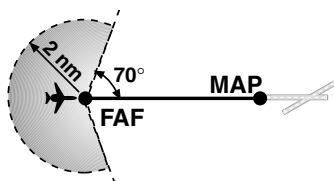
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## B. TIPS

1. The data base must be up to date.
2. Only one approach can be in the flight plan at a time.
3. **APT 8** page is used for approach and IAF selections. (Use the Active Waypoint pages when the destination airport is in the active flight plan.)
4. Data cannot be altered, added to or deleted from the approach procedures contained in the data base. (DME arc intercepts may be relocated along the arc through the **NAV 4** page or **FPL 0** page.)
5. To change or delete a SID, STAR or approach, select the **FPL 0** page, place the cursor over the name of the SID, STAR or approach, press **ENT** to change it, or **>CLR** then **ENT** to delete it.
6. Some approach waypoints in the data base may not appear on the approach plates (in some cases this includes the FAF)!
7. Waypoint suffixes attached to some flight plan waypoints:  
i - IAF, f - FAF, m - MAP, h - missed approach holding fix.
8. Use the **NAV 4** page for flying approaches.
9. At 30 nm from the destination airport the KLN 89B will go into APR **ARM** if there is an approach in the flight plan. Left/right D-bar scaling will change from  $\pm 5.0$  nm to  $\pm 1.0$  nm over the next 30 seconds.

## TIPS (Continued)

10. If the approach includes a DME arc, the DME arc intercept point will be a) on your present position radial off the arc VOR when you select an arc IAF, or b) the beginning of the arc if currently on a radial beyond the arc limit. To adjust the arc intercept to be compatible with a radar vector, bring up the first waypoint of the arc in the **NAV 4** page scanning field (or under the cursor on the **FPL 0** page), press **>CLR**, then **ENT**. Fly the arc in **LEG**. Adjust the HSI or CDI course pointer with reference to the desired track value on the **NAV 4** page (it will flash when the pointer needs to be adjusted). Left/right D-bar information is relative to the arc. Displayed distance is not along the arc but straight to the active waypoint. (The **ARC** radial is also displayed on the **NAV 4** page.)
11. Two nm from the FAF inbound and in **LEG**, the KLN 89B will go into **APR ACTV** and the D-bar scaling will change from  $\pm 1.0$  nm to  $\pm 0.3$  nm.
12. **APR ARM** to **APR ACTV** is automatic provided all of the following are satisfied:
  - a. In **APR ARM** (normally automatic).
  - b. In **LEG** mode!
  - c. FAF is the active waypoint!
  - d. Within 2 nm of the FAF.
  - e. Outside the FAF.
  - f. Inbound to the FAF.
  - g. RAIM is available. (For early prediction go to **OTH 3** page.)
13. RAIM availability is mandatory for approach operation.
14. **APR ACTV** mode is mandatory for approach operation.
15. **DIRECT-TO** operation between the FAF and **MAP** cancels approach **ACTV**. Fly the missed approach in **APR ARM**.
16. Flagged navigation inside the FAF may usually be restored by pressing the external GPS **APR** button to change from **ACTV** to **ARM**. Fly the missed approach procedure.
17. Instrument approaches using the KLN 89B may be essentially automatic starting 30 nm out (with manual baro setting update) or it may require judicious selection of the **OBS** and **LEG** modes.
18. **APR ARM** may be cancelled at any time by pressing the GPS **APR** button. (A subsequent press will reselect it.)



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**C. PAGE MESSAGES** - Messages that could appear during approach operations. Refer to the Pilot's Guide for a complete list of messages.

### XXXXX Deleted

**From FPL 0** --A pre-existing waypoint was deleted from FPL 0 because the same waypoint was in the Approach/SID/STAR just loaded into FPL 0.

### APR ACTV Annunciator

**Fail** --Indicates an annunciator drive circuit failure. Discontinue approach operation unless already on final approach inside the FAF.

**Adj Nav Crs to XXX°** --Manually adjust the mechanical HSI or CDI to the indicated value.

### APR ARM Annunciator

**Fail** --Indicates an annunciator drive circuit failure. Discontinue approach operation unless **APR ACTV** is annunciated.

## PAGE MESSAGES (Continued)

**Arm GPS Approach**--Manually arm approach mode. (A reminder given 3 nm from the FAF if the approach mode was disarmed manually.)

### **Bad Satellite Geometry**

**And RAIM Not Available** --Can appear in approach ACTV mode only. Integrity monitoring is lost and satellite geometry is degraded. Can be followed by a NAV flag.

### **Bad Satellite Geometry**

**See EPE on OTH 1 page** -- Integrity monitoring is lost and the estimated position error is greater than allowed for the current phase of flight. Cross check the position with other on-board equipment every 15 minutes.

### **Check APR ACTV**

**Annunciator** --Indicates an overcurrent condition in the annunciator circuit. Discontinue approach operation unless already on final approach inside the FAF.

### **Check APR ARM**

**Annunciator** --Indicates an overcurrent condition in the annunciator circuit. Discontinue approach operation unless APR ACTV is annunciated.

**GPS Course is XXX°** --Displays the new desired track when GPS is not displayed on the primary indicator.

**If Required Select OBS**--Use OBS mode for holding patterns or procedure turns. Appears 4 nm from a waypoint that normally would require the OBS mode.

**Press ALT To Set Baro** --A reminder given 30 nm from the destination airport to update the barometric setting.

**Press GPS APR for NAV** --After a NAV flag in approach ACTV mode, press GPS APR button to restore navigation for the missed approach. (Integrity monitoring is less critical in approach ARM mode so navigation may be restored.)

### **RAIM Not Available**

#### **APR Mode Inhibited**

**Predict RAIM on OTH 3** --RAIM is predicted to not be available at either the FAF or the MAP. Determine when RAIM will be available on the OTH 3 page. Integrity monitoring is required for approach operation.

### **RAIM Not Available**

**Cross Check Position** --Integrity monitoring is absent. Compare the GPS position with other on-board navigation equipment.

### **RAIM Position Error**

**Cross Check Position**--RAIM has detected a problem with a satellite. Compare the GPS position with other on-board navigation equipment.

### **Redundant WPTs in FPL**

#### **Edit Enroute WPTs**

**As Necessary**--Examine the active flight plan and remove those waypoints that occur both in the en route and the approach or SID/STAR sections of the flight plan.

**D. SCRATCHPAD MESSAGES** - Messages that could appear during approach operations. Refer to the Pilot's Guide for a complete list of messages.

**↔ CRS**

**XXX°**--When in OBS mode, manually adjust the HSI or CDI course pointer to the prescribed value to provide direct-to navigation.

**Fpl Is**

**Full**--The KLN 89B cannot add any more waypoints to the flight plan.

**Invalid**

**Add**--You can't add waypoints to the approach sequence.

**Invalid**

**Del**--You can't delete waypoints from the approach sequence.

**No Apr In Fpl** --No approach has been loaded into the flight plan when the APR ARM button is pressed.

**No Intcpt** --The aircraft's actual track does not intersect with the DME arc. Alter course so that the actual track does intercept the arc.

**D Base Expire** --A reminder that the data base is out of date.

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**NAV 4 (MOVING MAP) PAGE TIPS**

- To scan through the active flight plan waypoints, pull out and turn the right inner knob. With desired waypoint displayed in scanning window, press **↔** and **ENT** to go direct-to the selected waypoint.
- To change what information is displayed on the map, press the **CRSR** button, select Menu? and press the **ENT** button to bring up a pop-up menu.
  - Line 1: Display 5 nearest special use airspaces (SUAs); on or off
  - Line 2: Display 9 nearest VORs; on or off
  - Line 3: Display 9 nearest airports; on or off
  - Line 4: Map orientation; N=North up, DTK=Desired track up, TK = Actual track up (when groundspeed > 2 kts), HDG = Heading up (if heading supplied to the KLN 89(B))
- To change the map scale factor:
  1. Press the **CRSR** button. The cursor comes up over the map scale in the lower left corner of the map display.
  2. Use the right inner knob to change between scale factors.
  3. For terminal area operations select AUTO scale factor.
- To change the navigation information displayed in the lower left corner:
  1. Press the **CRSR** button
  2. Use the right outer knob to move the cursor to the cyclic field in the lower left corner
  3. Press **>CLR** to change between the choices, which are:
    - Groundspeed
    - Estimated Time En route (ETE) to the active waypoint
    - Crosstrack correction
    - Magnetic Desired Track (DTK). DTK is always displayed in this area during DME arc approaches

## KLN 89(B) Buttons

<b>MSG</b>	Displays the message page
<b>OBS</b>	Changes between Leg and OBS navigation modes
<b>ALT</b>	Displays the altitude pages, ALT 1 and ALT 2
<b>NRST</b>	Selects the nearest APT, VOR, NDB, INT, USR, SUA, FSS, or CTR
<b>D▶</b>	Selects a direct-to waypoint
<b>&gt;CLR</b>	Cancels operations, and changes cyclic fields
<b>ENT</b>	Approves an operation

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## Summary of Operation

- Emergency Nearest Airport Search - Press **NRST** then **ENT**.
- Operation of right knobs - Cursor on
  - Press **CRSR** button. With the cursor on, outer knob controls cursor location and inner knob selects the character.
  - With the inner knob in, make selection character by character.
  - With inner knob out, make selection by scanning through the data base alphabetically.
- Operation of right knobs - Cursor off
  - Outer knob selects page type (APT, VOR, etc.)
  - Inner knob selects specific page (APT 1, APT 2, etc.)
- Direct To operation
  - Press **D▶** once. Enter desired wpt using right concentric knobs, press **ENT** to view wpt info, press **ENT** to confirm.
  - Alternatively, highlight desired wpt in flight plan then press **D▶** then press **ENT** to confirm.
  - To center D-bar. With non-wpt page displayed press **D▶** then **ENT**.
  - To cancel direct to operation press **D▶** then **>CLR** then **ENT**.

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