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DA 40 D AFM
DA 40 F AFM

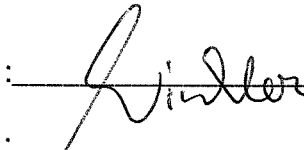



Supplement A11
KCS 55A

**SUPPLEMENT A11
TO THE AIRPLANE FLIGHT MANUAL
DA 40, DA 40 D, DA 40 F
COMPASS SYSTEM KCS 55A
BENDIX/KING**

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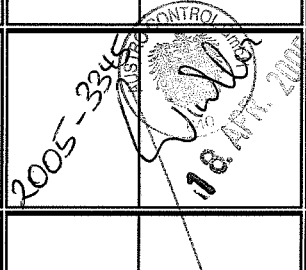

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Chapter	Page	Date
0	9-A11-1	15 Mar 2005
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	9-A11-8	15 Mar 2005
	9-A11-9	15 Mar 2005
	9-A11-10	15 Mar 2005
	9-A11-11	15 Mar 2005
	9-A11-12	15 Mar 2005
8	9-A11-13	15 Mar 2005
	9-A11-14	15 Mar 2005

0.3 TABLE OF CONTENTS

	Page
1. GENERAL	9-A11-4
2. OPERATING LIMITATIONS	9-A11-4
3. EMERGENCY PROCEDURES	9-A11-4
4A. NORMAL OPERATING PROCEDURES	9-A11-4
4B. ABNORMAL OPERATING PROCEDURES	9-A11-4
5. PERFORMANCE	9-A11-4
6. MASS AND BALANCE	9-A11-5
7. DESCRIPTION OF THE AIRPLANE AND ITS SYSTEMS	9-A11-5
8. AIRPLANE HANDLING, CARE AND MAINTENANCE	9-A11-14

1. GENERAL

This Supplement supplies the information necessary for the efficient operation of the airplane when the Compass System KCS 55A is installed. The information contained within this Supplement is to be used in conjunction with the complete AFM.

This Supplement is a permanent part of this AFM and must remain in this AFM at all times when the Compass System KCS 55A is installed.

2. LIMITATIONS

No change.

3. EMERGENCY PROCEDURES

No change.

4A. NORMAL OPERATING PROCEDURES

No change.

4B. ABNORMAL OPERATING PROCEDURES

No change.

5. PERFORMANCE

No change.

6. MASS AND BALANCE

Upon removal or installation of the KCS 55A Compass System the change of the empty mass and corresponding center of gravity of the airplane must be recorded according to Chapter 6 of the Airplane Flight Manual.

7. DESCRIPTION OF THE AIRPLANE AND ITS SYSTEMS

7.14 AVIONICS

GENERAL

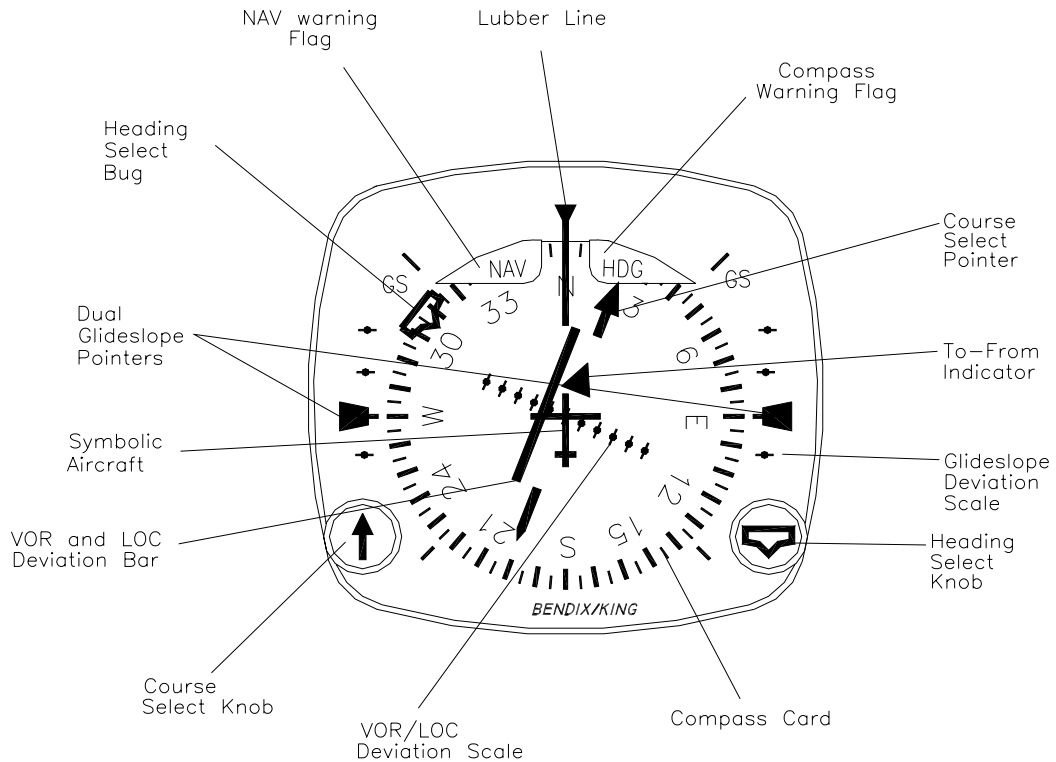
The KCS 55A Compass System includes the KA 51B Slaving Control and Compensator Unit, the KMT 112 Magnetic Slaving Transmitter and the KG 102 Directional Gyro as well as the KI 525A Pictorial Navigation Indicator.

The panel-mounted KI 525A HSI combines the display functions of both the standard Directional Gyro and the Course Deviation Indicator's VOR/LOC/Glideslope information to provide the pilot with a single presentation of the complete horizontal navigation situation. This greatly simplifies course orientation, interception and tracking, while eliminating the need for scan coordination between two separate indicators.

The KCS 55A Compass System has the feature to indicate alternatively information of the NAV #1 or information of the GPS. This is arranged with the GPS annunciation control unit MD 41 (see DA 40 Supplement A15). This switching unit allows to switch either NAV #1 information or GPS information to the KCS 55 A. For immediate crosscheck of the navigation information displayed on the KCS55A the navigation data must also be displayed directly on the NAV #1 or GPS receiver.

If the GNS 430 or 530 is installed, the indication of this information is controlled directly by the GNS 430 or 530 and displayed on the GPS annunciation unit MD 41-1488/1484 (see Supplement A23).

KI 525A INDICATOR



The KI 525A Pictorial Navigation Indicator is the panel display for the KCS 55A Compass System. It replaces the standard Directional Gyro and Course Deviation Indicator (CDI) in the airplane's panel, combining slaved heading and VOR/LOC/Glideslope information into one compact display. By providing a simple, comprehensive visual presentation of the airplanes heading and position in relation to a desired course, the pilot's navigation workload is considerably reduced.

DESCRIPTION OF INDICATOR AND DISPLAY FUNCTIONS

Compass Card

Responding to the input from the slaved directional gyro, this card rotates within the display so that the airplane heading is always at the top, under lubber line.

Lubber Line

The lubber line is a fixed white marker at the top of the display that indicates the airplane magnetic heading on the compass card.

Symbolic Airplane

The symbolic airplane is a fixed representation of the actual airplane. This miniature airplane always points toward the top of the display and the lubber line.

Selected Course Pointer

On this two-part arrow, the 'head' indicates the desired VOR or Localizer course and the 'tail' indicates the reciprocal. This pointer is set by rotating the course select knob.

Course Select Knob

The course select knob is used to rotate the course pointer to the desired course on the compass card. This knob corresponds to the Omni Bearing Selector (OBS) on standard NAV indicators.

VOR/RNAV and LOC Deviation

be positioned This bar corresponds to the 'left/right' needle on standard course deviation indicators. When the airplane is precisely on the VOR radial or Localizer course, it forms the center section of the selected course pointer and will be under the symbolic airplane. When off course or approaching a new course, it will move to one side or the other. Since the entire VOR and Localizer display rotates with the compass

card, the angular relationship between the deviation bar and the symbolic airplane provides a pictorial symbolic display of the airplane's position with respect to the selected course.

Deviation Scale

When tuned to a VOR frequency, each white dot represents two degrees of deviation left or right of course. When tuned to a Localizer, the deviation is 1/2 degree per dot. (When GPS data is selected for presentation, refer to the Pilot's Guide for the GPS receiver.)

Heading Select Bug

A moveable orange marker on the outer perimeter of the display, used primarily to select the desired heading you wish to fly. This desired heading is coupled to the KAP 140 Autopilot to provide the 'Heading Select' function.

Heading Select Knob

Used to rotate the heading select bug to a desired point on the compass card.

To-From Indicator

A white triangle near the center of the display that indicates, with reference to the OBS setting, whether the course selected is 'to' or 'from' the selected VOR station and/or RNAV waypoint.

Dual Glideslope Pointers

Chartreuse triangular pointers on either side of the display drop into view when a useable glideslope signal is received and retract out of view when the glideslope signal becomes marginal. During an ILS approach, these pointers indicate the relative position of the glideslope path with respect to the airplane. (In other words, if the pointers are above the center marker, the airplane is below the glideslope.) When on glideslope, the pointer will align with the center markers on the glideslope scale.

Glideslope Deviation Scale

White dots on each side of the display which, in conjunction with the glideslope pointers, indicate either 'above', 'below' or 'on glideslope' during an ILS approach.

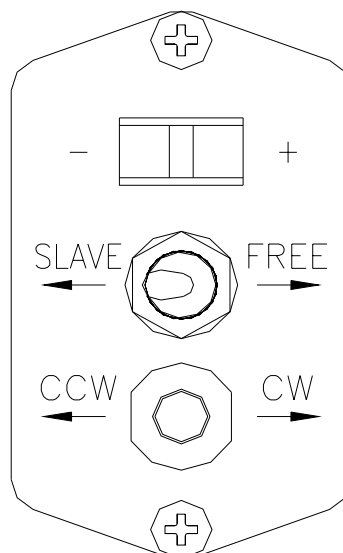
Compass Warning Flag

A red flag labeled 'HDG' becomes visible in the upper right quadrant of the display whenever the electrical power is inadequate or the directional gyro is not up to speed. Compass failures can occur which will not be annunciated by the 'HDG' flag. Therefore, periodic comparison with the standby compass is advised.

NAV Warning Flag

A red flag labeled 'NAV' becomes visible in the upper left quadrant of the display whenever a useable signal is not being received.

SLAVING METER (KA 51B)



This meter indicates any difference between the displayed heading and the magnetic heading. Right or up deflection indicates a clockwise error of the compass card. Left or down deflection indicates a counterclockwise error of the compass card. Whenever the airplane is in a turn and the card rotates, it is normal for this meter to show a full deflection to one side or another.

NOTE

During level flight it is normal for the meter needle to continuously move from side to side and to be fully deflected during a turn. If the needle stays fully deflected, left or right, during level flight, the free gyro mode can be used to center it as follows:

- *Slave and Free Gyro Switch* - When the switch is in the SLAVE position, the system is in the slaved gyro mode. When the switch is in the FREE position, the system is in the free gyro mode.
- *Clockwise Adjustment* - When the system is in the free gyro mode, holding the manual heading switch to the CW position will rotate the compass card to the right to eliminate left compass card error.
- *Counterclockwise Adjustment* - When the system is in the free gyro mode, holding the manual heading switch to the CCW position will rotate the compass card to the left to eliminate right compass card error.

KMT 112 MAGNETIC SLAVING TRANSMITTER

The unit senses the direction of the earth's magnetic field and continuously transmits this information through the slaving circuitry to the directional gyro which is automatically corrected for precession or 'drift'. This sensor is mounted in the right wing to eliminate the possibility of magnetic interference.

KG 102A DIRECTIONAL GYRO

The directional gyro provides gyro stabilization for the system and contains the slaving circuitry necessary for operation of the system. This sensor is also remote mounted.

OPERATING INSTRUCTIONS

Until power is applied to the KCS 55A System, and the directional gyro is up to speed, a red flag labeled 'HDG' will be visible in the upper right quadrant of the KI 525A Indicator. In operation, this warning flag will be visible whenever the power being supplied is inadequate or the gyro is not up to speed.

With the application of the power to the KCS 55A System, and gyro up to operating speed, the red 'HDG' flag should disappear from view.

If the KCS 55A System is in the slaved gyro mode, the compass card will automatically fast slave at the rate of 180 degrees per minute toward the airplane's magnetic heading. (Immediately after applying power, this compass card movement should be quite visible.) It will continue to fast slave until the proper magnetic heading is indicated, after which it will slave at a constant rate of three degrees per minute to keep the system aligned with the earth's magnetic field. Under some conditions it is possible for the system to stop slaving exactly 180 degrees from the correct heading. If this should occur, move the 'Slave' switch on the KA 51B to the unslaved (free) position. Rotate the compass card ± 10 degrees from the incorrect

heading by using the manual rotation switch and then return the system to slaved operation. The system will then slave to the correct heading.

For the free gyro operation, check the magnetic compass to determine the correct magnetic heading. Then use the manual slave switch to align the system with the earth's magnetic field. Periodic checks with the standby compass are recommended to check and correct for gyro precession.

Until a useable navigation signal is being received by the NAV system, a red flag labeled 'NAV' will be visible in the upper left quadrant of the KI 525A Indicator. In operation, this warning flag should be visible whenever an inadequate navigation signal is being received.

For normal navigation to or from a VOR or VORTAC, set the NAV receiver to the desired VOR or VORTAC frequency and the red navigation flag (NAV) should disappear from view if a usable signal is being received.

Rotate the course select knob to position the course pointer to the desired VOR course.

The VOR deviation bar represents the selected course, and the relationship of this bar to the symbolic airplane in the center of the instrument visually presents the actual relationship of the selected course to your airplane heading. (In other words, if the symbolic airplane on the display indicates approaching the deviation bar at 45 degrees, that is the angle at which your airplane is actually approaching the selected course.)

To prepare for an ILS approach, tune the NAV receiver to the desired Localizer frequency. If a usable Localizer signal is being received, the NAV warning flag will disappear.

For a front or back course approach, rotate the course select knob to set the course pointer on the inbound Localizer course. As with normal navigation (#6 above), the

LOC deviation bar represents the desired course. The relationship between this bar and the symbolic airplane gives a true picture of your airplane's position with respect to the Localizer course. Always setting the course pointer to the inbound Localizer course provides the correct deviation bar sensing whether flying a front or back course approach.

The glideslope deviation pointers should become visible on both sides of the display when a useable glideslope signal is received. If they do not come into view, a useable glideslope signal is not being received.

The glideslope pointers indicate the relative position of the glideslope path with respect to the airplane. (In other words, if the pointers are above the center marker, the airplane is below the glideslope.)

ABNORMAL CIRCUMSTANCES

If the Warning Flag (HDG) appears during operation, the compass card indications will be in error. Power may be removed from the KG 102A Directional Gyro by pulling the circuit breaker labeled DG. The Selected Course, VOR/LOC Deviation Bar, the NAV flag, and the To/From Indicator will remain in operation.

If the Navigation Warning Flag (NAV) appears during operation, there are several possibilities:

- (1) the NAV receiver is not turned on,
- (2) the NAV receiver is improperly turned,
- (3) the ground VOR or LOC station is malfunctioning,
- (4) the airplane is out of range of the selected ground station, or
- (5) the airplane NAV receiver has malfunctioned. (The compass card will continue to display the airplane heading even if a useable NAV signal is not being received.)

If the glideslope pointers remain out of view during a front course ILS approach, either the airplane glideslope receiver or the ground station glideslope transmitter is malfunctioning. Glideslope is usually not available during a back course approach. (The VOR and LOC course display will continue to function normally even if a useable glideslope signal is not being received.)

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.

If a slaving failure should occur, the Slave/Free Switch should be moved to select the free gyro mode. Then, by using manual clockwise or counterclockwise corrections, the compass can be rotated to the corrected heading as indicated on the standby compass. The KCS 55A system should continue to function normally except the heading information will be solely derived from the KG 102 A Directional Gyro. There will be no automatic heading correction and periodic adjustments must be made manually to correct for precession by reference to the standby magnetic compass, as with any directional gyro.

8. AIRPLANE HANDLING, CARE AND MAINTENANCE

No change.