FAA APPROVED PER STC SA1561CE-D

KAP 100/KAP 150/KFC 150
FLIGHT CONTROL SYSTEM
FOR
MOONEY M20J & M20K

INSTALLATION MANUAL

006-0249-00

REV. 13: MARCH 15, 1990

BENDIX/KING

PATENT PENDING

NOTICE

Instrument and gyro repair must be accomplished by a King approved INSTRUMENT SERVICE CENTER. Warranty is valid only when the dust cover seal is intact.

This document originated in the Avionics Certification Center. Any change in this document must originate in and be approved by the Avionics Certification Center. Material Review Board action is NOT authorized K-1900

KING

FAA APPROVED INSTALLATION MANUAL

FOR

MOONEY MODELS M20J AND M20K

WITH

KING KAP 100, KAP 150 AND KFC 150 AUTOMATIC FLIGHT CONTROL SYSTEM

LOG OF REVISIONS

Rev. No.	Page Number(s)	Description	Date of Revision	Approved By*
1	MDL, Cover Page, 1-5, 5-1	Updated MDL to show new Rev. Manual, changed roll servo P/N from 065-0051-01 to 065-0051-02 and roll clutch setting from 21 ±2 to 18 ±2 in-lbs. on M20K.	11/5/81	Ralph C. Cole Coordinator DAS4CE
2	MDL, Cover Page, 1-7, 6-1, 6-4, 7-4, 7-5, 8-1, 8-7, 9-1, 10-6 10-7 5-1	Updated MDL to show new Rev. Manual and updated bracketry revisions. Added component names and weight/balance data for bracketry. Revised roll pulley installation. Rotated pitch trim servo 90°. Substitute revised Autopilot Nav Switching Interconnect for Figure 10-A. Changed text from Figure 10-A to Figure 10-E. Changed Slip Clutch setting from 18 ±2 to 20 ±2 on M20K.	11/6/81	Ralph C. Cole Coordinator DAS4CE
3	MDL, Cover, I, Page A, 1-2, 3-1, 3-4, 8-7	Revised manual to eliminate Serial Number restrictions for M20J model. Revised location of aft pitch link for M20K. Added cooling air hose to KC 19X Instal. Kit.	11/16/81	Ralph C. Cole Coordinator DAS4CE
4	MDL, Cover Page I, B, D, 1-2, 1-3, 1-4, 1-5, 2-2, 3-1, 3-2 3-3, 3-4 4-1, 4-2, 6-1, 6-2, 6-3, 6-4, 6-8, 9-1, 10-2, 10-3, 10-4, 10-5, 10-6, 10-7, Sec. 11, A, C	Updated MDL to shown new Rev. Manual. Deleted KG 107 as option with KFC 150 System. Corrected various part numbers and item numbers in text and on illustrations. Corrected interconnects. Included new abbreviated Section 11. Added requirement for Marker Receiver for KAP 150 and KFC 150 Systems.	2/22/82	Ralph C. Cole Coordinator DAS4CE
5	Cover, MDL, 1-3, 3-1, 3-2, 5-1, 7-1	Changed Trim Servo P/N and Adapter Card P/N for Manual Trim improvement in M20J; incorporated latest Trim Cap Ass'y; corrected minor P/N errors.	5/24/82	Ralph C. Cole Coordinator DAS4CE

*For Authorized FAA Representative

FAA APPROVED INSTALLATION MANUAL

FOR

MOONEY MODELS M20J AND M20K

WITH

KING KAP 100, KAP 150 AND KFC 150 AUTOMATIC FLIGHT CONTROL SYSTEM

LOG OF REVISIONS

Rev. No.	Page Number(s)	Description	Date Of Revision	Approved By*
6	Cover, MDL, Various	Updated MDL to show new Rev. Manual. Added KA 185 Remote Mode Annunciator as an option. Brought Manual up to current level of KAP 100, KAP 150, KFC 150 System development.	5/6/83	Coordinator DA54CE
7	Cover, MDL, Various	Updated MDL to show new Rev. Manual and new AFMS. Added KAS 297B Altitude Selector as an option. Brought Manual up to current level of KAP 100, KAP 150, KFC 150 System development.	7/14/83	Coordinator DA54CE
8	Cover, MDL, Various	Updated MDL to show new Rev. Manual. Changed KC 190,KC 191,KC 192 dash numbers. Corrected miscellaneous errors.	12/9/83	Coordinator DA54CE
9	Cover, MDL, Page 2-4, 2-5, 11-1, 11-19,11-20, 11-21	Updated MDL to show new Rev. Manual. Corrected P/N of mating connector for KEA 130A. Revised KAS 297B alignment procedure.	3/16/84	Coordinator DA54CE
10	Cover, MDL, Various	Added 28 Volt airplanes. Changed Sonalert wiring for KAP 100 Systems.	3/8/85	Coordinator DA54CE
11	Cover, MDL, Various	Changed KC 191 and KC 192 Computer dash numbers. Changed adapter module dash numbers.	12/12/86	Coordinator DA54CE

*For Authorized FAA Representative

FAA APPROVED INSTALLATION MANUAL

FOR

MOONEY MODELS M20J AND M20K

WITH

KING KFC 100, KAP 150 AND KFC 150 AUTOMATIC FLIGHT CONTROL SYSTEM

LOG OF REVISIONS

Rev. No.	Page Number(s)	Description	Date Of Revision	Approved By*
12	Cover, MDL, A-2, 1-5, 1-9, 3-1, 3-2, 3-4, 3-5	Changed KC 191 and KC 192 computer dash numbers. Changed adapter module part numbers. Added drain line to KC 191 and KC 192 pneumatic plumbing.	3/6/87	Coordinator DAS4CE
13	Cover, MDL, All	Incorporated Service Bulletin 600-1810-30 (Safety wire cable guard posts on roll and pitch servos). Minor corrections. Reformatted all.	3/15/90	COORDINATOR DAS4CE Approved 4-13-90

*For Authorized FAA Representative

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United States of America
Department of Transportation — Federal Aviation Administration

Supplemental Type Certificate

Number SA1561CE-D

This certificate, issued to King Radio Corporation
400 N. Rogers Road
Olathe, Kansas 66061

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 3 of the Civil Air Regulations.

Original Product — Type Certificate Number: 2A3
Make: Mooney
Model: M20J, M20K

Description of Type Design Change: Install KAP 100 single axis, KAP 150 two axis, or KFC 150 two axis Flight Control System and optional KAS 297B Vertical Speed and Altitude Selector. (See Continuation Sheet for Required Data.)

Limitations and Conditions: This approval should not be extended to other specific airplanes of this model on which other previously approved modifications are incorporated, unless it is determined that the interrelationship between this change and any of those other previously approved modifications will introduce no adverse effect upon the airworthiness of that airplane.

This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: 7/16/81
Date of issuance: 11/6/81
Date reissued:
Date amended: 11/16/81, 7/29/83

By direction of the Administrator

Ralph V. Cole
(Signature)
Coordinator, DAS4CE
(Title)

Any alteration of this certificate is punishable by a fine of not exceeding $1,000, or imprisonment not exceeding 3 years, or both.

This certificate may be transferred in accordance with FAR 21.47.

FAA Form 8110-2 (10-60)

United States of America
Department of Transportation—Federal Aviation Administration

Supplemental Type Certificate

(Continuation Sheet)

Number SA1561CE-D

REQUIRED DATA:

KAP 100 Single Axis Flight Control System
1. Master Drawing List 155-9191-00, Rev. 2, dated 11/5/81
2. Airplane Flight Manual Supplement 006-0396-00, dated 11/6/81

KAP 150 and KFC 150 Two Axis Flight Control System
1. Master Drawing List 155-9191-00, Rev. 2, dated 11/5/81
2. Airplane Flight Manual Supplement 006-0396-01, dated 11/6/81

Optional KAS 297B Vertical Speed and Altitude Selector
1. Master Drawing List 155-9191-00, Rev. 8, dated 7/14/83
2. Airplane Flight Manual Supplement 006-0396-02, dated 7/29/83

Later FAA approved revisions to above listed data are incorporated without further revision to the Supplemental Type Certificate.

MASTER DRAWING LIST FOR

KAP 100, KAP 150 AND KFC 150 INSTALLATION

IN

MOONEY M20J AND M20K

This Master Drawing List is approved for the KAP 100, KAP 150 AND KFC 150 Systems in the following airplanes: Mooney M20J and Mooney M20K.

DOCUMENT NUMBER: 155-9191-00

DATE: 7/16/81

REV.	C.O. NO.	DATE	BY	REV.	C.O. NO.	DATE	BY
1	ENGR.	10/28/81	JK	10	ENGR.	3/16/84	IR
2	ENGR.	11/5/81	AS	11	ENGR.	3/8/85	IR
3	ENGR.	11/6/81	AS	12	ENGR.	12/12/86	IR
4	ENGR.	11/16/81	JK	13	ENGR.	3/6/87	IR
5	ENGR.	2/22/82	JK	14	ENGR.	3/15/90	LB
6	ENGR.	5/24/82	JK				
7	ENGR.	5/6/83	IR				
8	ENGR.	7/14/83	IR				
9	ENGR.	12/9/83	IR				

DOCUMENTS REQUIRED FOR INSTALLER TO INSTALL KAP 100, KAP 150 AND KFC 150 SYSTEMS

ITEM	PART NUMBER	DESCRIPTION	REV	DATE
1.	006-0249-00	Installation Manual	13	3/15/90
2.	006-0396-00	KAP 100 Airplane Flight Manual Supplement, M20J, M20K	4	3/8/85
3.	006-0396-01	KAP 150/KFC 150 Airplane Flight Manual Supplement, M20J, M20K	4	3/8/85
4.	006-0396-02	KAP 150/KFC 150 Airplane Flight Manual Supplement M20J, M20K Vertical Speed and Altitude Selector	0	7/29/83

DRAWINGS WHICH DEFINE THE DESIGN BUT ARE NOT NECESSARY FOR THE INSTALLATION

5.	028-0031-00	Trim Spur Gear	3	10/81
6.	047-4119-00/01	Bushing	0	3/18/76
7.	047-4123-00/01	Pulley Bracket Support	4	11/14/80
8.	047-4124-00/03	Pulley Bracket	4	11/11/80
9.	047-4126-00/01	L.H. Riser	4	11/11/80
10.	047-4127-00/01	R.H. Riser	4	11/11/80
11.	047-4132-00/03	Trim Support	5	11/26/80
12.	047-4133-00/01	Yaw Support	2	11/11/80
13.	047-4135-00/01	Trim Bracket Support (Bottom)	6	11/11/80
14.	047-4136-00/01	Trim Bracket Support (Top)	2	11/11/80
15.	047-4140-00	Pulley Bracket Assembly	1	7/21/76
16.	047-4141-00/01	Pulley Bracket	3	11/81
17.	047-4142-00/01	Pulley Bracket	3	11/81
18.	047-4143-00	Bearing Assembly	1	7/21/76
19.	047-4153-00/01	Angle Support	4	11/11/80
20.	047-4489-00/01	Pitch Link	0	1/14/77
21.	047-4508-00/01	Rod Clamp	3	10/78
22.	047-4607-00/01	Bracket Shim	1	11/11/80
23.	047-5051-00/01	Pitch Link	3	10/81
24.	047-5851-00/01	Pitch Mtg. Brkt	2	8/25/81
25.	047-5852-00/01	Trim Mounting Plate	1	11/81
26.	047-5866-00/01	Trim Mounting Bracket	2	11/81
27.	047-5908-00/01	Roll Mounting Bracket	5	8/20/81
28.	047-6088-00/02	Roll Top Support	0	12/17/81
29.	047-6089-00/02	Roll Bottom Support	1	1/82
30.	057-2358-00	Decal, Alt. Select	0	3/24/80
31.	057-2543-00	Decal, Mic	0	12/10/81

ITEM	PART NUMBER	DESCRIPTION	REV	DATE
32.	057-2764-00	Breaker Decal	1	8/8/8333.
076-0970-00/09		Pulley Spacer	2	11/81
34.	076-0971-00	Trim Rod Sleeve	2	7/81
35.	076-1265-00	Switch Button	0	9/4/81
36.	088-1091-00/04	Switch Cap	6	3/83
37.	088-1093-00	Switch Cap Base Plate	2	12/81
38.	090-0418-00	Chain-Roller Pitch Trim	0	9/4/81
39.	300-2093-00	Roll Cable Assembly	4	9/81
40.	300-2936-00	Pitch Cable	2	12/81
41.	300-2959-00	Switch Cap Assy.	4	7/85
42.	300-2960-00	Trim Switch Assembly	3	7/85

SYSTEM ORDERING INSTRUCTIONS

The KAP 100 System is a single roll axis autopilot without flight director. The KAP 100 System comes equipped with the KG 107 non-slaved DG standard, but may be equipped with optional KCS 55A Slaved Compass System and/or manual electric pitch trim control.

The KAP 150 System is a two axis autopilot (roll and pitch axis) with electric pitch trim control and without flight director. The KAP 150 may be equipped with the optional KCS 55A or the KG 107 non-slaved DG.

The KFC 150 System is a two axis autopilot (roll and pitch axis) with electric pitch trim control and flight director. The KCS 55A Slaved Compass System is standard with the KFC 150 System, but is not a part of the STC.

There are various systems available for each airplane. Each system includes the necessary equipment (computers, indicators, controllers, etc.), as well as the basic installation kit (mounting brackets, control cables, switches, hardware, etc.) used for the installation.

CAA APPROVED AIRPLANES

When ordering a KAP 100 System for a CAA approved airplane one of the following KG 258 attitude horizon indicators must be ordered. The KG 258 for FAA approved airplanes will need to be deleted from the KAP 100 System part number. MAKE THIS REQUEST WHEN ORDERING THE SYSTEM.

0 Degree panel KG 258 060-0020-29 CAA installations
8 Degree panel KG 258 060-0020-30 CAA installations

When ordering a KAP 150 System for a CAA approved airplane one of the following KG 258 attitude horizon indicators must be ordered. The KG 258 for FAA approved airplanes will need to be deleted from the KAP 150 System part number. MAKE THIS REQUEST WHEN ORDERING THE SYSTEM.

0 Degree panel KG 258 060-0020-27 CAA installations
8 Degree panel KG 258 060-0020-28 CAA installations

Systems have been configured for installation in the field, therefore no additional field installation kit is required as this is included in the System number.

TRANSFERABLE AUTOPILOT (NAV 1/NAV 2 SWITCHING)

For Systems with the KCS 55A Compass System, if it is to be installed so that the autopilot can be transferred from NAV 1 to NAV 2, be sure the compass system is ordered with the optional bootstrap heading output transmitter. A NAV 2 omni bearing indicator will require a course datum synchro. The appropriate King indicators for this type of installation are the KI 202, KI 203, KI 204, and KI 206. When ordering one of these indicators, you must specify course datum synchro required. Please note this option increases the price of these indicators. Nav switching is an option and is not included in the basic systems. Should this option be desired, the following items should be ordered from King Radio. A KA 118-00 or -01, and autopilot switch kit 050-1592-02, or -03. KA 118-00 has an internal oscillator and the KA 118-01 does not have the internal oscillator. The KA 118 with internal oscillator can be used to excite the KI 525A bootstrap heading transmitter which drives the NAV 2 course datum for the autopilot. When the installation does not have a 400 Hz source, the KA 118 with internal oscillator can be used for the above purpose. The KA 118 internal oscillator will provide just enough power to excite the signal KI 525A bootstrap heading transmitter. When the installation does have a 400Hz source, a KA 118 without oscillator can be used. The 050-1592-02 is for 14V airplanes and the 050-1592-03 is for 28V airplanes.

For systems with the KG 107 Directional Gyro only the 050-1592-02 or -03 is required.

	WITH KG 107	WITH KCS 55A
SWITCH KIT 14V	050-1592-02	050-1592-02 KA 118-00 or -01
SWITCH KIT 28V	050-1592-03	050-1592-03 KA 118-00 or -01

ALTITUDE PRESELECT/ALERTING, VERTICAL SPEED SELECT SYSTEM

The Altitude Preselect/Alerting and vertical speed system allows the pilot to select, arm, and upon approaching the preset altitude, capture and automatically engage altitude hold. The system also provides an altitude alert function and vertical speed preselect and hold. The airplane must be equipped with a KAP 150 or KFC 150 Flight Control System. The system in the airplane must include a KC 191 or KC 192 Flight Computer KPN:

KC 191 065-0054-02 14V
065-0054-03 28V

KC 192 065-0042-02 14V
065-0042-03 28V

The Altitude/VS Preselect is not available for the KAP 100 System.

A KEA 130A encoding altimeter is required for automatic barometric correction and is included in the 150AZALT-XX system.

Also, when used with the KT 76/A or KT 78/A Transponder isolation diodes are required for proper operation.

SPECIAL PARTS

The airplane wiring harness is not provided nor is it available from King Radio. You must fabricate or obtain your airplane wiring harness from someone other than King Radio. Mating connectors are supplied as part of the airplane's installation kit. Circuit breakers are not provided for any system.

A Marker Beacon Receiver is listed as required equipment. It is not required for KAP 100 Systems, but is required for all KAP/KFC 150 Systems.

TEST SET

The KTS 158 test set is required for all KAP 100/KAP 150 Autopilot and KFC 150 Flight Director/Autopilot installations. The test set is designed for maintenance of the KAP 100/KAP 150/KFC 150 Systems, and will perform both the ramp check function as well as the bench unit repair function. The installation and checkout of these Systems can not be satisfactorily completed without a KTS 158.

AIRPLANE: Mooney M20J - 14VDC

STC NUMBER: SA1561CE-D

LIMITATIONS: None

		HEADING SYSTEM		
		KG 107 DIR. GYRO	KCS 55A W/O BOOTSTRAP	KCS 55A W/BOOTSTRAP
ROLL AXIS AUTOPILOT	*KAP 100	100AM201-04	100AM201-05	100AM201-06
	*KAP 100 W/MAN ELEC TRIM	100AM201-07	100AM201-08	100AM201-09
TWO AXIS AUTOPILOT	*KAP 150	150AM201-02	150AM201-03	150AM201-04
TWO AXIS AP/FD	KFC 150	NOT AVAIL	150AM201-51	150AM201-52

*For CAA (United Kingdom) approved installations, see KAP 100/150, KFC 150 Ordering instructions.

SPECIAL PARTS REQUIRED:

1. Cooling fan: KA 33 or equivalent
2. Marker Beacon Receiver: KMA 24, KR 21 or equivalent
3. Radio Master Switch: 050-2024-00 or equivalent
4. Switchable Pitch Trim C.B.: 930023-9 S/N 24-1213 and below
   930023-109 S/N 24-1214 and above
5. Instrument Panel and Placards

(ITEMS 4 AND 5 MUST BE ORDERED FROM MOONEY AIRCRAFT CORP.)

OPTIONS

ALTITUDE/VERTICAL SPEED SELECT SYSTEM: 150AZALT-04 (Not available with KAP 100) (KAS 297B/KEA 130A)

KA 185 REMOTE MODE ANNUNCIATOR: KA0185-00 (Not available with KAP 100)

NAV 1/NAV 2 SWITCHING: See KAP 100/150, KFC 150 ordering instructions

PUBLICATIONS:

006-0249-00 Installation Manual
006-0396-00 FMS KAP 100
006-0396-01 FMS KAP/KFC 150
006-0396-02 FMS KAS 297B
006-8377-00 Pilot Guide

AIRPLANE: Mooney M20K - 14VDC

STC NUMBER: SA1561CE-D

LIMITATIONS: None

		HEADING SYSTEM		
		KG 107 DIR. GYRO	KCS 55A W/O BOOTSTRAP	KCS 55A W/BOOTSTRAP
ROLL AXIS AUTOPILOT	*KAP 100	100AM231-04	100AM231-05	100AM231-06
	*KAP 100 W/MAN ELEC TRIM	100AM231-07	100AM231-08	100AM231-09
TWO AXIS AUTOPILOT	*KAP 150	150AM231-02	150AM231-03	150AM231-04
TWO AXIS AP/FD	KFC 150	NOT AVAIL	150AM231-51	150AM231-52

*For CAA (United Kingdom) approved installations, see KAP 100/150, KFC 150 Ordering instructions.

SPECIAL PARTS REQUIRED:

1. Cooling fan: KA 33 or equivalent
2. Marker Beacon Receiver: KMA 24, KR 21 or equivalent
3. Radio Master Switch: 050-2024-00 or equivalent
4. Switchable Pitch Trim C.B.: 930023-9 S/N 25-0612 and below
   930023-109 S/N 25-0613 and above
5. Instrument Panel: 820313-501
6. Placards

(ITEMS 4, 5 AND 6 MUST BE ORDERED FROM MOONEY AIRCRAFT CORP.)

——— OPTIONS ———

ALTITUDE/VERTICAL SPEED SELECT SYSTEM: 150AZALT-04 (Not available with KAP 100)
(KAS 297B/KEA 130A)

KA 185 REMOTE MODE ANNUNCIATOR: KA0185-00 (Not available with KAP 100)

NAV 1/NAV 2 SWITCHING: See KAP 100/150, KFC 150 ordering instructions

PUBLICATIONS:

006-0249-00 Installation Manual
006-0396-00 PMS KAP 100
006-0396-01 PMS KAP/KFC 150
006-0396-02 PMS KAS 297B
006-8377-00 Pilot Guide

AIRPLANE: Mooney M20J - 28VDC

STC NUMBER: SA1561CE-D

LIMITATIONS: None

		HEADING SYSTEM		
		KG 107 DIR. GYRO	KCS 55A W/O BOOTSTRAP	KCS 55A W/BOOTSTRAP
ROLL AXIS AUTOPILOT	*KAP 100	100AM201-10	100AM201-11	100AM201-12
	*KAP 100 W/MAN ELEC TRIM	100AM201-13	100AM201-14	100AM201-15
TWO AXIS AUTOPILOT	*KAP 150	150AM201-05	150AM201-06	150AM201-07
TWO AXIS AP/FD	KFC 150	NOT AVAIL	150AM201-53	150AM201-54

*For CAA (United Kingdom) approved installations, see KAP 100/150, KFC 150 Ordering instructions.

SPECIAL PARTS REQUIRED:

1. Cooling fan: KA 33 or equivalent
2. Marker Beacon Receiver: KMA 24, KR 21 or equivalent
3. Radio Master Switch: 050-2024-01 or equivalent
4. Switchable Pitch Trim C.B.: 930023-109
5. Instrument Panel and Placards

(ITEMS 4 AND 5 MUST BE ORDERED FROM MOONEY AIRCRAFT CORP.)

OPTIONS

ALTITUDE/VERTICAL SPEED SELECT SYSTEM: 150AZALT-19 (Not available with KAP 100) (KAS 297B/KEA 130A)

KA 185 REMOTE MODE ANNUNCIATOR: KA0185-01 (Not available with KAP 100)

NAV 1/NAV 2 SWITCHING: See KAP 100/150, KFC 150 ordering instructions

PUBLICATIONS:

006-0249-00 Installation Manual
006-0396-00 FMS KAP 100
006-0396-01 FMS KAP/KFC 150
006-0396-02 FMS KAS 297B
006-8377-00 Pilot Guide

AIRPLANE: Mooney M20K - 28VDC

STC NUMBER: SA1561CE-D

LIMITATIONS: None

		HEADING SYSTEM		
		KG 107 DIR. GYRO	KCS 55A W/O BOOTSTRAP	KCS 55A W/BOOTSTRAP
ROLL AXIS AUTOPILOT	*KAP 100	100AM231-10	100AM231-11	100AM231-12
	*KAP 100 W/MAN ELEC TRIM	100AM231-13	100AM231-14	100AM231-15
TWO AXIS AUTOPILOT	*KAP 150	150AM231-05	150AM231-06	150AM231-07
TWO AXIS AP/FD	KFC 150	NOT AVAIL	150AM231-53	150AM231-54

*For CAA (United Kingdom) approved installations, see KAP 100/150, KFC 150 Ordering instructions.

SPECIAL PARTS REQUIRED:

1. Cooling fan: KA 33 or equivalent
2. Marker Beacon Receiver: KMA 24, KR 21 or equivalent
3. Radio Master Switch: 050-2024-01 or equivalent
4. Switchable Pitch Trim C.B.: 930023-109
5. Instrument Panel: 820313-501
6. Placards

(ITEMS 4, 5 AND 6 MUST BE ORDERED FROM MOONEY AIRCRAFT CORP.)

——— OPTIONS ———

ALTITUDE/VERTICAL SPEED SELECT SYSTEM: 150AZALT-19 (Not available with KAP 100) (KAS 297B/KEA 130A)

KA 185 REMOTE MODE ANNUNCIATOR: KA0185-01 (Not available with KAP 100)

NAV 1/NAV 2 SWITCHING: See KAP 100/150, KFC 150 ordering instructions

PUBLICATIONS:

006-0249-00 Installation Manual
006-0396-00 FMS KAP 100
006-0396-01 FMS KAP/KFC 150
006-0396-02 FMS KAS 297B
006-8377-00 Pilot Guide

1.0 INTRODUCTION

WARNING

READ THE INSTALLATION MANUAL BEFORE BEGINNING THE INSTALLATION OF THE SYSTEM. AIRPLANE WIRING HARNESS AND CIRCUIT BREAKERS ARE NOT PROVIDED FOR ANY SYSTEM.

If a KCS 55A Compass System is to be installed, refer to the KCS 55A Installation Manual, (KPN 006-0111-XX) for installation instructions of the system components. It is not a part of this STC.

The numbers on the photographs indicate the item number on the appropriate parts list. These same numbers are also called out in the corresponding section of text.

Exercise extreme care when unpacking each unit. Make a visual inspection of each unit for evidence of damage incurred during shipment. If a claim for damage is to be made, save the shipping container to substantiate the claim. When all equipment is removed, place in the shipping container all packing materials for use in unit storage or reshipment.

The only tools required are those common tools normally used by an airplane mechanic, with the exception of the items listed below, which must be ordered separately from King Radio Corporation.

KTS 158 Autopilot Tester, KPN 071-5068-00

1.1 This STC is approved for the following configurations in the Mooney Model M20J, 14 Volt.

	SYSTEM NUMBER	DESCRIPTION
	100AM201-04:	KAP 100 - Roll Axis Autopilot with Non Slave DG.
	100AM201-05:	KAP 100 - Roll Axis Autopilot with KCS 55A Compass System w/o Bootstrap.
	100AM201-06:	KAP 100 - Roll Axis Autopilot with KCS 55A Compass System w/Bootstrap.
	100AM201-07:	KAP 100 - Roll Axis Autopilot with Electric Pitch Trim Control with Non-Slave DG.
	100AM201-08:	KAP 100 - Roll Axis Autopilot with Electric Pitch Trim Control with KCS 55A Compass System w/o Bootstrap.
	100AM201-09:	KAP 100 - Roll Axis Autopilot with Electric Pitch Trim Control with KCS 55A Compass System w/Bootstrap.
	150AM201-02:	KAP 150 - Roll and Pitch Axis Autopilot with Electric Pitch Trim Control with Non-Slave DG.
	150AM201-03:	KAP 150 - Roll and Pitch Axis Autopilot with Electric Pitch Trim Control with KCS 55A Compass System w/o Bootstrap.
	150AM201-04:	KAP 150 - Roll and Pitch Axis Autopilot with Electric Pitch Trim Control with KCS 55A Compass System w/Bootstrap.
	150AM201-51:	KFC 150 - Roll and Pitch Axis Autopilot/Flight Director with Electric Pitch Trim Control with KCS 55A Compass System w/o Bootstrap.
	150AM201-52:	KFC 150 - Roll and Pitch Axis Autopilot/Flight Director with Electric Pitch Trim Control with KCS 55A Compass System w/Bootstrap.
OPTIONS	150AZALT-04:	Altitude Preselect/VS Hold - provides preselection of an altitude with automatic autopilot altitude hold engagement once that altitude is reached. Provides vertical speed hold function as well. Also provides audible and visual altitude alerting. (For use with KAP 150 or KFC 150 systems only.
	KA0185-00:	Remote Mode Annunciator - provides pilot line-of-sight annunciation of autopilot operational modes. (For use with KAP 150 or KFC 150 systems only).
	NONE: (See ordering instructions)	Transferable Autopilot - allows switching of autopilot from Nav 1 to Nav 2. (Not available as a system - requires specific equipment).

1.2 The system numbers described in 1.1 consist of the following:

		MODEL MOONEY M20J, 14 VOLT										
		100AM201-XX						150AM201-XX				
PART NUMBER	UNIT/DESCRIPTION	-04	-05	-06	-07	-08	-09	-02	-03	-04	-51	-52
060-0020-01	KG 258 Att. Horizon Ind.	-	-	-	-	-	-	1	1	1	-	-
060-0020-03	KG 258 Att. Horizon Ind.	1	1	1	1	1	1	-	-	-	-	-
060-0017-00	KI 256 Flight Dir. Ind.	-	-	-	-	-	-	-	-	-	1	1
050-1518-00	KI 256 Instal Kit	1	1	1	1	1	1	1	1	1	1	1
060-0022-00	KG 107 Directional Gyro Ind	1	-	-	1	-	-	1	-	-	-	-
050-1866-00	KG 107 Instal Kit	1	-	-	1	-	-	1	-	-	-	-
065-0055-02	KC 190 Computer/Controller	1	1	1	1	1	1	-	-	-	-	-
065-0054-02	KC 191 Computer/Controller	-	-	-	-	-	-	1	1	1	-	-
065-0042-02	KC 192 Computer/Controller	-	-	-	-	-	-	-	-	-	1	1
050-1636-00	KC 19X Instal Kit	1	1	1	1	1	1	1	1	1	1	1
065-5025-10	KC 19X Adapter Module	1	1	1	-	-	-	-	-	-	-	-
065-5025-27	KC 19X Adapter Module	-	-	-	-	-	-	1	1	1	1	1
065-5025-28	KC 19X Adapter Module	-	-	-	1	1	1	-	-	-	-	-
065-5026-06	KC 19X Adapter Module	-	-	-	-	-	-	-	1	1	-	-
065-5026-07	KC 19X Adapter Module	-	-	-	-	-	-	1	-	-	-	-
065-5026-09	KC 19X Adapter Module	-	-	-	-	1	1	-	-	-	-	-
065-5026-13	KC 19X Adapter Module	-	-	-	1	-	-	-	-	-	-	-
065-5026-14	KC 19X Adapter Module	-	-	-	-	-	-	-	-	-	1	1
065-5026-16	KC 19X Adapter Module	-	1	1	-	-	-	-	-	-	-	-
065-5026-18	KC 19X Adapter Module	1	-	-	-	-	-	-	-	-	-	-
065-0050-04	KS 177 Pitch Servo	-	-	-	-	-	-	1	1	1	1	1
065-0051-01	KS 178 Roll Servo	1	1	1	1	1	1	1	1	1	1	1
065-0052-04	KS 179 Pitch Trim Servo	-	-	-	1	1	1	1	1	1	1	1
050-1817-00	KS 17X Instal Kit	1	1	1	2	2	2	3	3	3	3	3
050-1965-00	Documentation Kit KK1000	1	1	1	1	1	1	1	1	1	1	1
050-1960-00	Cockpit Kit KK1001	-	-	-	1	1	1	1	1	1	1	1
050-1962-00	Roll Kit KK1003	1	1	1	1	1	1	1	1	1	1	1
050-1963-00	Pitch Kit KK1004	-	-	-	-	-	-	1	1	1	1	1
050-1964-00	Trim Kit KK1005	-	-	-	1	1	1	1	1	1	1	1
050-1961-00	Pneumatic Kit KK1002	-	-	-	-	-	-	1	1	1	1	1
KCS0055A-02	KCS 55A Comp Sys w/o Bstrp	-	1	-	-	1	-	-	1	-	1	-
KCS0055A-03	KCS 55A Comp Sys w/ Bstrp	-	-	1	-	-	1	-	-	1	-	1

OPTIONS

150AZALT-XX		-04
006-0249-00	Installation Manual	1
006-0396-02	Flight Manual Supplement	1
065-0065-00	KAS 297B Alt. Sel.	1
050-2131-00	KAS 297B Installation Kit	1
066-3064-05	KEA 130A Altimeter	1
050-2175-00	KEA 130A Installation Kit	1
050-1839-01	Installation Kit	1
071-1097-14	Light Tray, 14V	1

KA0185-XX		-00
065-0058-00	KA 185 Annunciator	1
060-2025-00	KA 185 Instal Kit	1

1.3 This STC is approved for the following configurations in the Mooney Model M20K, 14 Volt.

SYSTEM NUMBER	DESCRIPTION
100AM231-04:	KAP 100 - Roll Axis Autopilot with Non Slave DG.
100AM231-05:	KAP 100 - Roll Axis Autopilot with KCS 55A Compass System w/o Bootstrap.
100AM231-06:	KAP 100 - Roll Axis Autopilot with KCS 55A Compass System w/Bootstrap.
100AM231-07:	KAP 100 - Roll Axis Autopilot with Electric Pitch Trim Control with Non-Slave DG.
100AM231-08:	KAP 100 - Roll Axis Autopilot with Electric Pitch Trim Control with KCS 55A Compass System w/o Bootstrap.
100AM231-09:	KAP 100 - Roll Axis Autopilot with Electric Pitch Trim Control with KCS 55A Compass System w/Bootstrap.
150AM231-02:	KAP 150 - Roll and Pitch Axis Autopilot with Electric Pitch Trim Control with Non-Slave DG.
150AM231-03:	KAP 150 - Roll and Pitch Axis Autopilot with Electric Pitch Trim Control with KCS 55A Compass System w/o Bootstrap.
150AM231-04:	KAP 150 - Roll and Pitch Axis Autopilot with Electric Pitch Trim Control with KCS 55A Compass System w/Bootstrap.
150AM231-51:	KFC 150 - Roll and Pitch Axis Autopilot/Flight Director with Electric Pitch Trim Control with KCS 55A Compass System w/o Bootstrap.
150AM231-52:	KFC 150 - Roll and Pitch Axis Autopilot/Flight Director with Electric Pitch Trim Control with KCS 55A Compass System w/Bootstrap.
OPTIONS 150AZALT-04:	Altitude Preselect/VS Hold - provides preselection of an altitude with automatic autopilot altitude hold engagement once that altitude is reached. Provides vertical speed hold function as well. Also provides audible and visual altitude alerting. (For use with KAP 150 or KFC 150 systems only.
KA0185-00:	Remote Mode Annunciator - provides pilot line-of-sight annunciation of autopilot operational modes. (For use with KAP 150 or KFC 150 systems only).
NONE: (See ordering instructions)	Transferable Autopilot - allows switching of autopilot from Nav 1 to Nav 2. (Not available as a system - requires specific equipment).

1.4 The system numbers described in 1.3 consist of the following:

		MODEL MOONEY M20K, 14 VOLT										
		100AM231-XX						150AM231-XX				
PART NUMBER	UNIT/DESCRIPTION	-04	-05	-06	-07	-08	-09	-02	-03	-04	-51	-52
060-0020-01	KG 258 Att. Horizon Ind.	-	-	-	-	-	-	1	1	1	-	-
060-0020-03	KG 258 Att. Horizon Ind.	1	1	1	1	1	1	-	-	-	-	-
060-0017-00	KI 256 Flight Dir. Ind.	-	-	-	-	-	-	-	-	-	1	1
050-1518-00	KI 256 Instal Kit	1	1	1	1	1	1	1	1	1	1	1
060-0022-00	KG 107 Directional Gyro Ind	1	-	-	1	-	-	1	-	-	-	-
050-1866-00	KG 107 Instal Kit	1	-	-	1	-	1	1	-	-	-	-
065-0055-02	KC 190 Computer/Controller	1	1	1	1	1	1	-	-	-	-	-
065-0054-02	KC 191 Computer/Controller	-	-	-	-	-	-	1	1	1	-	-
065-0042-02	KC 192 Computer/Controller	-	-	-	-	-	-	-	-	-	1	1
050-1636-00	KC 19X Instal Kit	1	1	1	1	1	1	1	1	1	1	1
065-5025-94	KC 19X Adapter Module	-	-	-	-	-	-	-	-	-	1	1
065-5025-06	KC 19X Adapter Module	-	-	-	1	1	1	-	-	-	-	-
065-5025-94	KC 19X Adapter Module	-	-	-	-	-	-	1	1	1	-	-
065-5025-11	KC 19X Adapter Module	1	1	1	-	-	-	-	-	-	-	-
065-5026-04	KC 19X Adapter Module	-	-	-	-	-	-	-	1	1	-	-
065-5026-05	KC 19X Adapter Module	-	-	-	-	-	-	1	-	-	-	-
065-5026-08	KC 19X Adapter Module	-	-	-	-	1	1	-	-	-	-	-
065-5026-12	KC 19X Adapter Module	-	-	-	1	-	-	-	-	-	-	-
065-5026-15	KC 19X Adapter Module	-	-	-	-	-	-	-	-	-	1	1
065-5026-17	KC 19X Adapter Module	-	1	1	-	-	-	-	-	-	-	-
065-5026-19	KC 19X Adapter Module	1	-	-	-	-	-	-	-	-	-	-
065-0050-04	KS 177 Pitch Servo	-	-	-	-	-	-	1	1	1	1	1
065-0051-02	KS 178 Roll Servo	1	1	1	1	1	1	1	1	1	1	1
065-0052-04	KS 179 Pitch Trim Servo	-	-	-	1	1	1	1	1	1	1	1
050-1817-00	KS 17X Instal Kit	1	1	1	2	2	2	3	3	3	3	3
050-1965-00	Documentation Kit KK1000	1	1	1	1	1	1	1	1	1	1	1
050-1960-00	Cockpit Kit KK1001	-	-	-	1	1	1	1	1	1	1	1
050-1962-00	Roll Kit KK1003	1	1	1	1	1	1	1	1	1	1	1
050-1963-00	Pitch Kit KK1004	-	-	-	-	-	-	1	1	1	1	1
050-1964-00	Trim Kit KK1005	-	-	-	1	1	1	1	1	1	1	1
050-1961-00	Pneumatic Kit KK1002	-	-	-	-	-	-	1	1	1	1	1
KCS0055A-02	KCS 55A Comp Sys w/o Bstrp	-	1	-	-	1	-	-	1	-	1	-
KCS0055A-03	KCS 55A Comp Sys w/ Bstrp	-	-	1	-	-	1	-	-	1	-	1

OPTIONS

150AZALT-XX		-04
006-0249-00	Installation Manual	1
006-0396-02	Flight Manual Supplement	1
065-0065-00	KAS 297B Alt. Sel.	1
050-2131-00	KAS 297B Installation Kit	1
066-3064-05	KEA 130A Altimeter	1
050-2175-00	KEA 130A Installation Kit	1
050-1839-01	Installation Kit	1
071-1097-14	Light Tray, 14V	1

KA0185-XX		-00
065-0058-00	KA 185 Annunciator	1
060-2025-00	KA 185 Instal Kit	1

1.5 This STC is approved for the following configurations in the Mooney Model M20J, 28 Volt.

SYSTEM NUMBER	DESCRIPTION
100AM201-10:	KAP 100 - Roll Axis Autopilot with Non Slave DG.
100AM201-11:	KAP 100 - Roll Axis Autopilot with KCS 55A Compass System w/o Bootstrap.
100AM201-12:	KAP 100 - Roll Axis Autopilot with KCS 55A Compass System w/Bootstrap.
100AM201-13:	KAP 100 - Roll Axis Autopilot with Electric Pitch Trim Control with Non-Slave DG.
100AM201-14:	KAP 100 - Roll Axis Autopilot with Electric Pitch Trim Control with KCS 55A Compass System w/o Bootstrap.
100AM201-15:	KAP 100 - Roll Axis Autopilot with Electric Pitch Trim Control with KCS 55A Compass System w/Bootstrap.
150AM201-05:	KAP 150 - Roll and Pitch Axis Autopilot with Electric Pitch Trim Control with Non-Slave DG.
150AM201-06:	KAP 150 - Roll and Pitch Axis Autopilot with Electric Pitch Trim Control with KCS 55A Compass System w/o Bootstrap.
150AM201-07:	KAP 150 - Roll and Pitch Axis Autopilot with Electric Pitch Trim Control with KCS 55A Compass System w/Bootstrap.
150AM201-53:	KFC 150 - Roll and Pitch Axis Autopilot/Flight Director with Electric Pitch Trim Control with KCS 55A Compass System w/o Bootstrap.
150AM201-54:	KFC 150 - Roll and Pitch Axis Autopilot/Flight Director with Electric Pitch Trim Control with KCS 55A Compass System w/Bootstrap.
OPTIONS 150AZALT-19:	Altitude Preselect/VS Hold - provides preselection of an altitude with automatic autopilot altitude hold engagement once that altitude is reached. Provides vertical speed hold function as well. Also provides audible and visual altitude alerting. (For use with KAP 150 or KFC 150 systems only.
KA0185-01:	Remote Mode Annunciator - provides pilot line-of-sight annunciation of autopilot operational modes. (For use with KAP 150 or KFC 150 systems only).
NONE: (See ordering instructions)	Transferable Autopilot - allows switching of autopilot from Nav 1 to Nav 2. (Not available as a system - requires specific equipment).

1.6 The system numbers described in 1.5 consist of the following:

		MODEL MOONEY M20J, 28 VOLT										
		100AM201-XX						150AM201-XX				
PART NUMBER	UNIT/DESCRIPTION	-10	-11	-12	-13	-14	-15	-05	-06	-07	-53	-54
060-0020-01	KG 258 Att. Horizon Ind.	-	-	-	-	-	-	1	1	1	-	-
060-0020-03	KG 258 Att. Horizon Ind.	1	1	1	1	1	1	-	-	-	-	-
060-0017-00	KI 256 Flight Dir. Ind.	-	-	-	-	-	-	-	-	-	1	1
050-1518-00	KI 256 Instal Kit	1	1	1	1	1	1	1	1	1	1	1
060-0022-00	KG 107 Directional Gyro Ind	1	-	-	1	-	-	1	-	-	-	-
050-1866-00	KG 107 Instal Kit	1	-	-	1	-	-	1	-	-	-	-
065-0055-03	KC 190 Computer/Controller	1	1	1	1	1	1	-	-	-	-	-
065-0054-03	KC 191 Computer/Controller	-	-	-	-	-	-	1	1	1	-	-
065-0042-03	KC 192 Computer/Controller	-	-	-	-	-	-	-	-	-	1	1
050-1636-00	KC 19X Instal Kit	1	1	1	1	1	1	1	1	1	1	1
065-5025-10	KC 19X Adapter Module	1	1	1	-	-	-	-	-	-	-	-
065-5025-27	KC 19X Adapter Module	-	-	-	-	-	-	1	1	1	1	1
065-5025-28	KC 19X Adapter Module	-	-	-	1	1	1	-	-	-	-	-
065-5026-06	KC 19X Adapter Module	-	-	-	-	-	-	-	1	1	-	-
065-5026-07	KC 19X Adapter Module	-	-	-	-	-	-	1	-	-	-	-
065-5026-09	KC 19X Adapter Module	-	-	-	-	1	1	-	-	-	-	-
065-5026-13	KC 19X Adapter Module	-	-	-	1	-	-	-	-	-	-	-
065-5026-14	KC 19X Adapter Module	-	-	-	-	-	-	-	-	-	1	1
065-5026-16	KC 19X Adapter Module	-	1	1	-	-	-	-	-	-	-	-
065-5026-18	KC 19X Adapter Module	1	-	-	-	-	-	-	-	-	-	-
065-0050-04	KC 177 Pitch Servo	-	-	-	-	-	-	1	1	1	1	1
065-0051-01	KS 178 Roll Servo	1	1	1	1	1	1	1	1	1	1	1
065-0052-14	KS 179 Pitch Trim Servo	-	-	-	1	1	1	1	1	1	1	1
050-1817-00	KS 17X Instal Kit	1	1	1	2	2	2	3	3	3	3	3
050-1965-00	Documentation Kit KK1000	1	1	1	1	1	1	1	1	1	1	1
050-1960-00	Cockpit Kit KK1001	-	-	-	1	1	1	1	1	1	1	1
050-1962-00	Roll Kit KK1003	1	1	1	1	1	1	1	1	1	1	1
050-1963-00	Pitch Kit KK1004	-	-	-	-	-	-	1	1	1	1	1
050-1964-00	Trim Kit KK1005	-	-	-	1	1	1	1	1	1	1	1
050-1961-00	Pneumatic Kit KK1002	-	-	-	-	-	-	1	1	1	1	1
KCS0055A-00	KCS 55A Comp Sys w/o Bstrp	-	1	-	-	1	-	-	1	-	1	-
KCS0055A-01	KCS 55A Comp Sys w/ Bstrp	-	-	1	-	-	1	-	-	1	-	1

OPTIONS

150AZALT-XX		-19
006-0249-00	Installation Manual	1
006-0396-02	Flight Manual Supplement	1
065-0065-00	KAS 297B Alt. Sel.	1
050-2131-00	KAS 297B Installation Kit	1
066-3064-05	KEA 130A Altimeter	1
050-2175-00	KEA 130A Installation Kit	1
050-1839-01	Installation Kit	1
071-1097-28	Light Tray, 28V	1

KA0185-XX		-01
065-0058-01	KA 185 Annunciator	1
060-2025-00	KA 185 Instal Kit	1

1.7 This STC is approved for the following configurations in the Mooney Model M20K, 28 Volt.

SYSTEM NUMBER	DESCRIPTION
100AM231-10:	KAP 100 - Roll Axis Autopilot with Non Slave DG.
100AM231-11:	KAP 100 - Roll Axis Autopilot with KCS 55A Compass System w/o Bootstrap.
100AM231-12:	KAP 100 - Roll Axis Autopilot with KCS 55A Compass System w/Bootstrap.
100AM231-13:	KAP 100 - Roll Axis Autopilot with Electric Pitch Trim Control with Non-Slave DG.
100AM231-14:	KAP 100 - Roll Axis Autopilot with Electric Pitch Trim Control with KCS 55A Compass System w/o Bootstrap.
100AM231-15:	KAP 100 - Roll Axis Autopilot with Electric Pitch Trim Control with KCS 55A Compass System w/Bootstrap.
150AM231-05:	KAP 150 - Roll and Pitch Axis Autopilot with Electric Pitch Trim Control with Non-Slave DG.
150AM231-06:	KAP 150 - Roll and Pitch Axis Autopilot with Electric Pitch Trim Control with KCS 55A Compass System w/o Bootstrap.
150AM231-07:	KAP 150 - Roll and Pitch Axis Autopilot with Electric Pitch Trim Control with KCS 55A Compass System w/Bootstrap.
150AM231-53:	KFC 150 - Roll and Pitch Axis Autopilot/Flight Director with Electric Pitch Trim Control with KCS 55A Compass System w/o Bootstrap.
150AM231-54:	KFC 150 - Roll and Pitch Axis Autopilot/Flight Director with Electric Pitch Trim Control with KCS 55A Compass System w/Bootstrap.
OPTIONS 150AZALT-19:	Altitude Preselect/VS Hold - provides preselection of an altitude with automatic autopilot altitude hold engagement once that altitude is reached. Provides vertical speed hold function as well. Also provides audible and visual altitude alerting. (For use with KAP 150 or KFC 150 systems only.
KA0185-01:	Remote Mode Annunciator - provides pilot line-of-sight annunciation of autopilot operational modes. (For use with KAP 150 or KFC 150 systems only).
NONE: (See ordering instructions)	Transferable Autopilot - allows switching of autopilot from Nav 1 to Nav 2. (Not available as a system - requires specific equipment).

1.8 The system numbers described in 1.7 consist of the following:

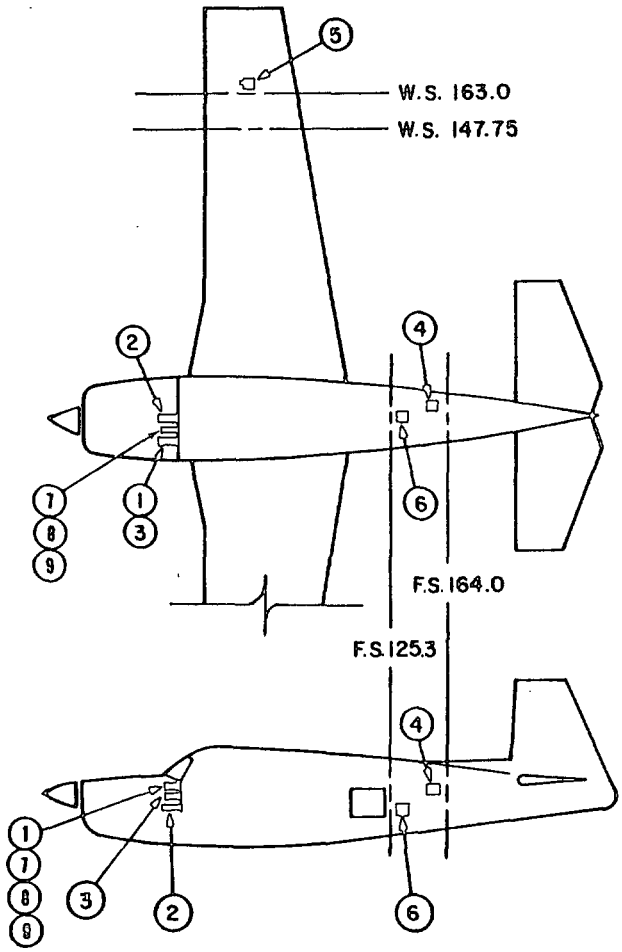
		MODEL MOONEY M20K, 28 VOLT										
		100AM231-XX						150AM231-XX				
PART NUMBER	UNIT/DESCRIPTION	-10	-11	-12	-13	-14	-15	-05	-06	-07	-53	-54
060-0020-01	KG 258 Att. Horizon Ind.	-	-	-	-	-	-	1	1	1	-	-
060-0020-03	KG 258 Att. Horizon Ind.	1	1	1	1	1	1	-	-	-	-	-
060-0017-00	KI 256 Flight Dir. Ind.	-	-	-	-	-	-	-	-	-	1	1
050-1518-00	KI 256 Instal Kit	1	1	1	1	1	1	1	1	1	1	1
060-0022-00	KG 107 Directional Gyro Ind	1	-	-	1	-	-	1	-	-	-	-
050-1866-00	KG 107 Instal Kit	1	-	-	1	-	1	1	-	-	-	-
065-0055-03	KC 190 Computer/Controller	1	1	1	1	1	1	-	-	-	-	-
065-0054-03	KC 191 Computer/Controller	-	-	-	-	-	-	1	1	1	-	-
065-0042-03	KC 192 Computer/Controller	-	-	-	-	-	-	-	-	-	1	1
050-1636-00	KC 19X Instal Kit	1	1	1	1	1	1	1	1	1	1	1
065-5025-94	KC 19X Adapter Module	-	-	-	-	-	-	-	-	-	1	1
065-5025-06	KC 19X Adapter Module	-	-	-	1	1	1	-	-	-	-	-
065-5025-94	KC 19X Adapter Module	-	-	-	-	-	-	1	1	1	-	-
065-5025-11	KC 19X Adapter Module	1	1	1	-	-	-	-	-	-	-	-
065-5026-04	KC 19X Adapter Module	-	-	-	-	-	-	-	1	1	-	-
065-5026-05	KC 19X Adapter Module	-	-	-	-	-	-	1	-	-	-	-
065-5026-08	KC 19X Adapter Module	-	-	-	-	1	1	-	-	-	-	-
065-5026-12	KC 19X Adapter Module	-	-	-	1	-	-	-	-	-	-	-
065-5026-15	KC 19X Adapter Module	-	-	-	-	-	-	-	-	-	1	1
065-5026-17	KC 19X Adapter Module	-	1	1	-	-	-	-	-	-	-	-
065-5026-19	KC 19X Adapter Module	1	-	-	-	-	-	-	-	-	-	-
065-0050-04	KC 177 Pitch Servo	-	-	-	-	-	-	1	1	1	1	1
065-0051-02	KS 178 Roll Servo	1	1	1	1	1	1	1	1	1	1	1
065-0052-14	KS 179 Pitch Trim Servo	-	-	-	1	1	1	1	1	1	1	1
050-1817-00	KS 17X Instal Kit	1	1	1	2	2	2	3	3	3	3	3
050-1965-00	Documentation Kit KK1000	1	1	1	1	1	1	1	1	1	1	1
050-1960-00	Cockpit Kit KK1001	-	-	-	1	1	1	1	1	1	1	1
050-1962-00	Roll Kit KK1003	1	1	1	1	1	1	1	1	1	1	1
050-1963-00	Pitch Kit KK1004	-	-	-	-	-	-	1	1	1	1	1
050-1964-00	Trim Kit KK1005	-	-	-	1	1	1	1	1	1	1	1
050-1961-00	Pneumatic Kit KK1002	-	-	-	-	-	-	1	1	1	1	1
KCS0055A-00	KCS 55A Comp Sys w/o Bstrp	-	1	-	-	1	-	-	1	-	1	-
KCS0055A-01	KCS 55A Comp Sys w/ Bstrp	-	-	1	-	-	1	-	-	1	-	1

OPTIONS

150AZALT-XX		-19
006-0249-00	Installation Manual	1
006-0396-02	Flight Manual Supplement	1
065-0065-00	KAS 297B Alt. Sel.	1
050-2131-00	KAS 297B Installation Kit	1
066-3064-05	KEA 130A Altimeter	1
050-2175-00	KEA 130A Installation Kit	1
050-1839-01	Installation Kit	1
071-1097-28	Light Tray, 28V	1

KA0185-XX		-01
065-0058-01	KA 185 Annunciator	1
060-2025-00	KA 185 Instal Kit	1

1.9 EQUIPMENT LOCATIONS FOR M20J & M20K



[1] KG 258 OR KI 256

[2] KC 190 OR KC 191 OR KC 192

[3] KG 107

[4] KS 177 PITCH

[5] KS 178 ROLL

[6] KS 179 TRIM

[7] KA 185 ANNUNCIATOR

[8] KEA 130A ALTIMETER

[9] KAS 297B ALT SEL

FIGURE 1-A EQUIPMENT LOCATIONS
M20J & M20K

1.10 The following weights, arms and moments are listed with all components applicable to this STC. The weight and balance data for the specific installation should be derived by only those components which were installed for the specific autopilot configuration.

ITEM	WEIGHT(POUNDS)	ARM(INCHES)	MOMENT
KG 258 Attitude Horizon Ind.	3.1	11.6	36.0
KI 256 Flight Dir. Ind.	3.3	11.6	38.3
KG 107 Directional Gyro Ind.	2.70	11.5	31.1
KA 185 Annunciator	0.60	13.95	8.4
KAS 297B Selector	1.20	11.10	13.3
KEA 130A Altimeter	1.90	12.10	23.0
KC 190 Computer/Controller	1.90	10.0	19.0
KC 191 Computer/Controller	2.30	9.7	22.3
KC 192 Computer/Controller	2.50	9.8	24.5
KS 177 Pitch Servo	3.32	140.5	466.5
KS 178 Roll Servo	3.23	57.2	184.8
KS 179 Trim Servo	3.40	130.2	442.7
Roll Bracketry W/Hdwr.	2.0	59.75	119.5
Pitch Bracketry W/Hdwr.	1.25	144.50	180.6
Trim Bracketry W/Hdwr.	1.94	133.75	259.5

1.11 The following current drains are listed with all components applicable to this STC. The electrical load analysis for the specific installation should be derived by only those components which were installed for the specific autopilot configuration.

ITEM	CURRENT DRAIN (AMPS) 14 VDC	CURRENT DRAIN (AMPS) 28 VDC
KG 258	0.16	0.08
KI 256	0.7	0.70
KG 107	0.20	0.10
KA 185	1.50	0.60
KAS 297B	0.40	0.20
KEA 130A	0.15	0.12
KC 190	1.30	0.60
KC 191	1.8	0.90
KC 192	1.8	0.90
KS 177 (PITCH)	2.00	1.50
KS 178 (ROLL)	2.00	1.50
KS 179 (TRIM)	2.00	1.50

If a KCS 55A Slaved Compass System is installed, refer to the Installation Manual for that system for current drains of system components.

2.0 INDICATOR INSTALLATION

This section applies to the installation of the KI 256, KG 258, KG 107, optional KA 185 and optional KAS 297B units.

The KI 256/KG 258 Unit Installation Kit 050-1518-00 consists of the following:

ITEM	KING PART NO.	DESCRIPTION	SPEC	QTY
1	030-2002-00	Connector	PMA	1
2	030-1010-00	Connector Hood	PMA	1
3	030-1008-00	Lever/Pivot Assembly	PMA	1
4	047-3937-01	Nut Plate	PMA	1
5	089-5115-12	Screw FH #6-32 x 3/4	PMA	4

The KG 107 Unit Installation Kit 050-1866-00 consists of the following:

ITEM	KING PART NO.	DESCRIPTION	SPEC	QTY
6	030-2016-00	Conn 7 Pin	PMA	1
7	047-3937-01	KI 525A nut plate	PMA	1
8	089-5115-12	Screw FH #6-32 x 3/4	PMA	4

2.1 KG 258 OR KI 256 INSTALLATION

A. The KG 258 Attitude Horizon Indicator is to be installed for the KAP 100 and KAP 150 Systems and the KI 256 Flight Director Indicator is to be installed for the KFC 150 Systems.

B. The KI 256 or KG 258 is mounted on the instrument panel, above and left of the pilot's control wheel as shown in Figure 2-A. A maximum 10 to 20 degrees viewing angle from the pilot's normal line of vision to the center of the indicator is allowed.

NOTE

BE SURE TO READ SECTION 11.0, GROUND CHECKS BEFORE INSTALLING THE KI 256 OR KG 258 IN THE AIRPLANE.

C. The KI 256 or the KG 258 is mounted through the front of the airplane panel and should be secured from the back per Figure 12-B with the nut plate (047-3937-01) (Item 4) and four #6-32 screws (089-5115-12) (Item 5) that are provided.

D. Using the connector (030-2002-00) (Item 1), hood (030-1010-00) (Item 2), and lever/pivot assembly (030-1008-00) (Item 3) provided, connect the wiring to the unit as shown in Section 10.

E. The KI 256 or KG 258 is plumbed in the same manner as any air driven gyro. The ports for vacuum are located on the rear of the unit. The inlet port is clearly marked as such. Use the existing plumbing and hardware to connect the pneumatic gauge lines to the proper fittings. Figure 2-B is used to plumb the gyro to the airplane's existing vacuum or pressure system.

F. A proper air filtration system is required for the KI 256 and KG 258. Most airplanes being manufactured are equipped with a central filtering system of 0.3 microns capacity. If the airplane is not so equipped, the installing agency must put a filter in to guarantee proper operation of the KI 256 and KG 258.

NOTE

FAA REGULATION (REF. FAR 23.1331) REQUIRES THAT A VACUUM/PRESSURE INDICATOR BE INSTALLED TO MONITOR THE AMOUNT OF VACUUM OR PRESSURE SUPPLIED TO THE KI 256 OR KG 258, IF ONE IS NOT ALREADY IN THE AIRPLANE.

2.2 KG 107 INSTALLATION

A. The KG 107 Non-Slave DG Indicator is to be installed for the KAP 100 or the KAP 150 Systems when the KCS 55A Slave Compass System is not installed.

B. The KG 107 is mounted on the instrument panel, above and left of the pilot's control wheel, as shown in Figure 2-A. A maximum 10 to 20 degree viewing angle from the pilot's normal line of vision to the center of the indicator is allowed.

C. The KG 107 is mounted through the front of the airplane panel and should be secured from the back per Figure 12-A with the nut plate (047-3937-01) (Item 7) and four #6-32 screws (089-5115-12) (Item 8) that are provided.

D. Using the connector (030-2016-00) (Item 6) provided, connect the wiring to the unit as shown in Section 10.

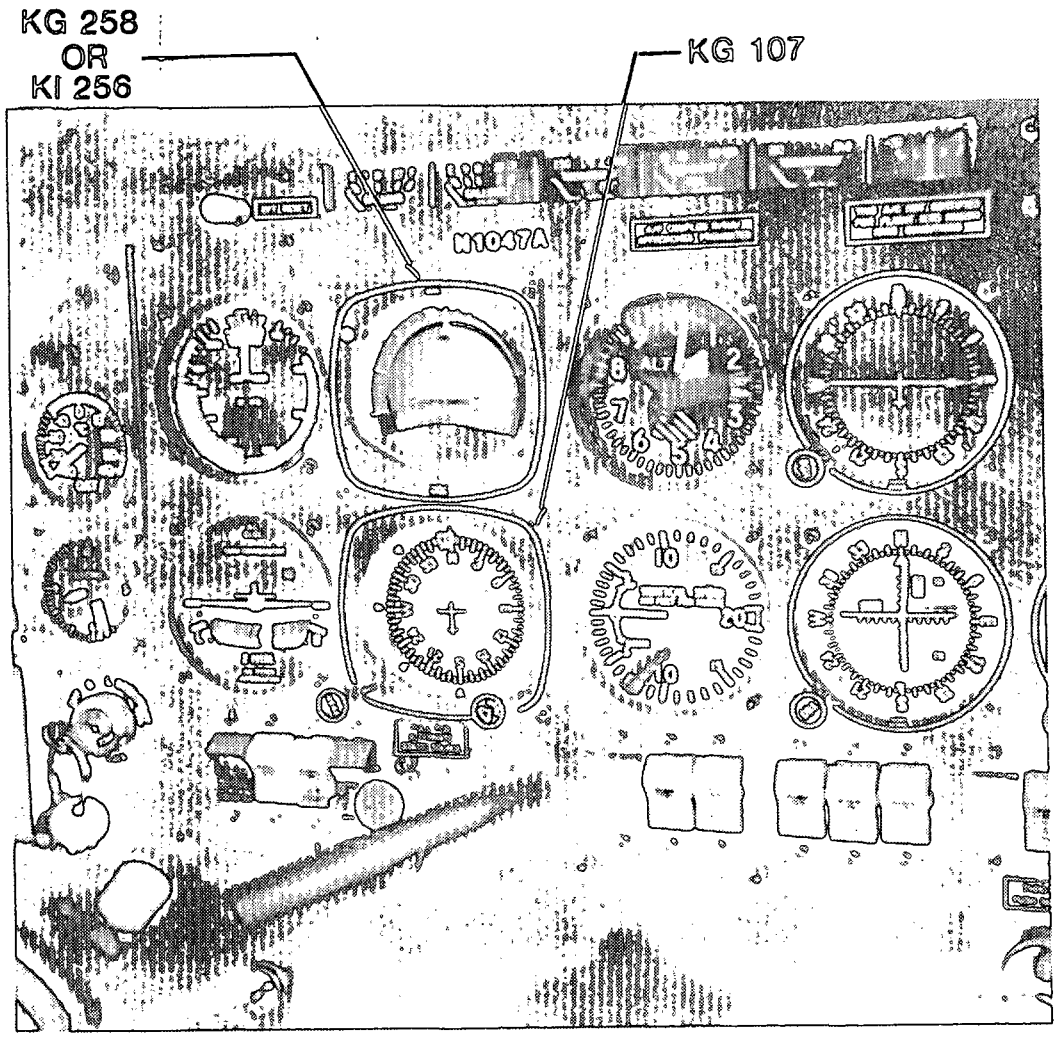


FIGURE 2-A KG 107, KI 256, KG 258
PANEL LOCATION

E. The KG 107 is plumbed in the same manner as any air driven DG. The ports for vacuum are located on the rear of the unit. The inlet port is clearly marked as such. Use the existing plumbing and hardware to connect the pneumatic gauge lines to the proper fittings. Figure 2-B is used to plumb the gyro to the airplane's existing vacuum system.

F. A proper air filtration system is required for the KG 107. Most airplanes being manufactured are equipped with a central filtering system of 0.3 microns capacity. If the airplane is not so equipped, the installing agency must put a filter in to guarantee proper operation of the KI 256 and KG 258.

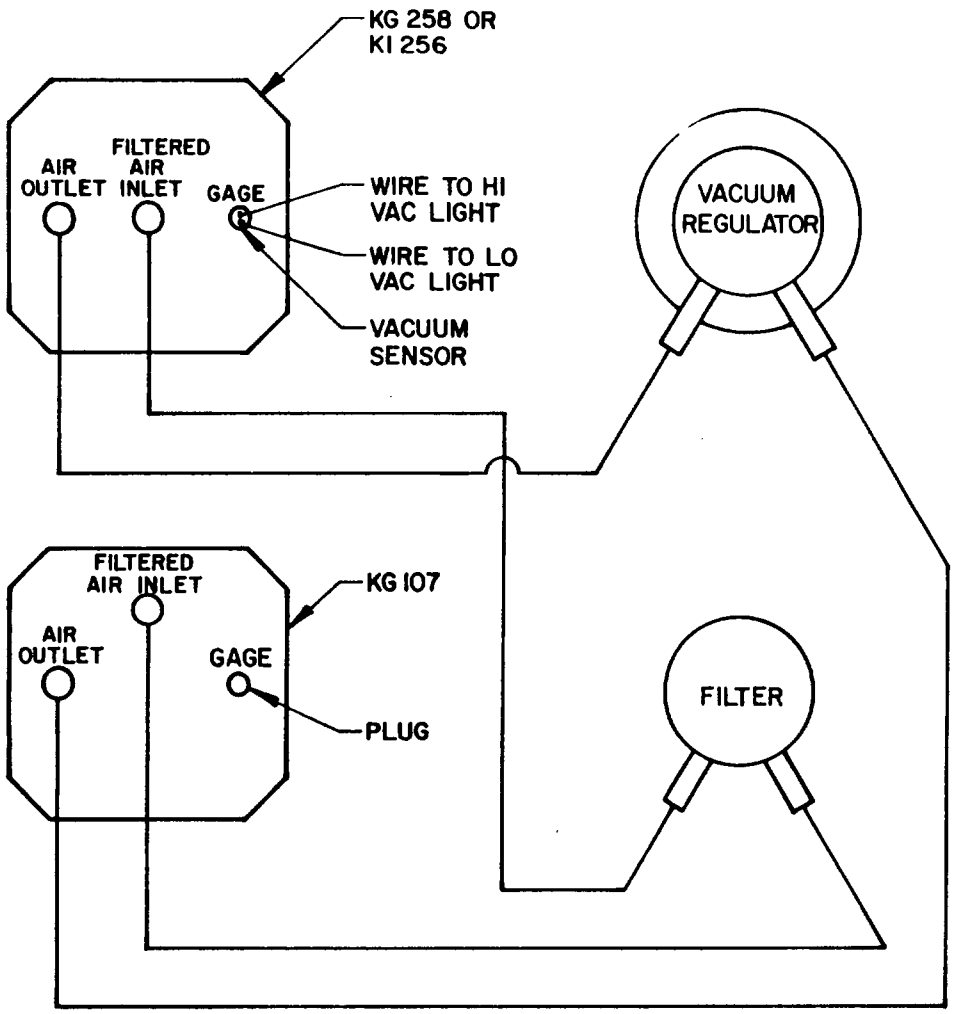


FIGURE 2-B KG 107, KG 258, KI 256
PNEUMATIC PLUMBING

2.3 OPTIONAL KA 185 UNIT INSTALLATION

The KA 185 Unit Installation Kit 050-2025-00 consists of the following:

ITEM	KING PART NO.	DESCRIPTION	SPEC	QTY
9	030-0107-00	Connector	PMA	1
10	088-0450-00	Connector Hood	PMA	1
11	089-5111-08	Screw 4-40 x 1/2	PMA	2
12	089-6123-07	Screw 4-40 x 7/16	PMA	2

A. The KA 185 is mounted on the right side of the pilot's instrument panel below the landing gear control knob.

B. Secure the KA 185 to the instrument panel using two screws (089-5111-08) (Item 11) and two #4-40 nuts.

C. Using the connector (030-0107-00) (Item 9), Hood (088-0450-00) (Item 10) and two screws (089-6123-07) (Item 12) connect the wiring per section 10 of this manual.

2.4 OPTIONAL KAS 297B INSTALLATION

The KAS 297B Unit Installation Kit 050-2131-00 consists of the following.

ITEM	KING PART NO.	DESCRIPTION	SPEC	QTY
13	030-2349-16	Connector	PMA	1
14	030-2351-13	Connector Hood	PMA	1
15	071-4029-00	Instrument Clamp	PMA	1
16	089-5115-12	Screw 6-32 x 3/4	PMA	4
17	089-6085-12	Screw 6-32 x 3/4	PMA	4

The KEA 130A Unit Installation Kit 050-2175-00 consists of the following:

ITEM	KING PART NO.	DESCRIPTION	SPEC	QTY
18	030-1025-00	Screw Lock Assy	PMA	2
19	030-1065-00	Connector Hood	PMA	1
20	030-2347-01	Connector, 15 Pin	PMA	1
21	030-2528-00	Connector, 3 Pin	PMA	1
22	089-5115-16	Screw 6-32 x 1	PMA	3
23	089-6085-16	Screw 6-32 x 1	PMA	3

The Installation Kit 050-1839-01 consists of the following:

ITEM	KING PART NO.	DESCRIPTION	SPEC	QTY
24	038-0008-01	Sonalert	PMA	1
25	057-2764-00	Breaker Decal	PMA	1
26	057-2358-00	Decal, Alt Select	PMA	1

WARNING

THE KAS 297B ALTITUDE SELECTOR CAN ONLY BE INSTALLED WITH EITHER A KAP 150 SYSTEM OR A KFC 150 SYSTEM. THE KAS 297B IS NOT A STAND ALONE SYSTEM. ONE OF THE FOLLOWING COMPUTERS MUST BE USED WHEN THE KAS 297B IS INSTALLED.

KAP 150 SYSTEM, KC 191 COMPUTER P/N 065-0054-02 (14 VDC)
KFC 150 SYSTEM, KC 192 COMPUTER P/N 065-0042-02 (14 VDC)

KAP 150 SYSTEM, KC 191 COMPUTER P/N 065-0054-03 (28 VDC)
KFC 150 SYSTEM, KC 192 COMPUTER P/N 065-0042-03 (28 VDC)

A. The KEA 130A Encoding Altimeter is located in the normal altimeter opening of the pilot's instrument panel. (Directly to the right of the KG 258/KI 256 unit and above the vertical speed indicator). The KAS 297B Altitude Selector should be located in the pilot's instrument panel so it can be easily seen and reached by the pilot.

B. Install the KEA 130A Encoding Altimeter in the pilot's instrument panel. Using the connector (030-2347-01) (Item 20), the hood (030-1065-00) (Item 19), the connector (030-2528-00) (Item 21) and the lock assemblies (030-1025-00) (Item 18) connect the wiring per Section 10 of this manual. Apply the breaker decal (057-2764-00) (Item 25) to identify the one amp pullable circuit breaker installed for the KEA 130A.

C. Cut the proper opening in the pilot's instrument panel for installation of the KAS 297B. See Section 12 of this manual for unit dimensions. Install the KAS 297B unit in the pilot's instrument panel.

D. Using the connector (030-2349-16) (Item 13), hood (030-2351-13) (Item 14), and instrument clamp (071-4029-00) (Item 15) connect the KAS 297B to the wiring harness per Section 10 of this manual.

NOTE

AT THE INSTALLER'S DISCRETION, POWER FOR THE KAS 297B MAY BE PROVIDED THRU A SEPARATE ONE AMP PULLABLE CIRCUIT BREAKER. AN "ALT SELECT" DECAL (057-2358-00) (ITEM 26) IS INCLUDED IN THE INSTALLATION KIT. APPLY THE DECAL TO IDENTIFY THE OPTIONAL CIRCUIT BREAKER.

E. The Sonalert (038-0008-01) (Item 24) can be installed in the pilot's overhead speaker area. Secure the sonalert using the sonalert attaching ring. When the audio alerting from the KAS 297B unit is connected to the airplane's audio amplifier system the KAS 297B sonalert can be omitted. See Section 10 of this manual for wiring diagrams.

3.0 COMPUTER/CONTROLLER INSTALLATION

This section applies to the installation of the KC 190/191/192 units.

The KC 190/191/192 Unit Installation Kit 050-1636-00 consists of the following:

ITEM	KING PART NO.	DESCRIPTION	SPEC	QTY
1	030-1094-68	Conn w/Polarizer	PMA	1
2	030-1094-69	Conn w/Polarizer	PMA	1
3	030-1107-80	Terminal	PMA	1
4	090-0253-01	Clamp	PMA	1
5	089-2353-01	Nut clip 6-32	PMA	4
6	089-5903-08	Scr PHP 4-40 x 1/2	PMA	4
7	089-6012-08	Scr FHP 6-32 x 1/2	PMA	4
8	150-0038-00	Hose	PMA	2 ft.
Not Req'd	089-2051-24	Speed Nut	PMA	4

The Pneumatic Installation Kit 050-1961-00 consists of the following:

ITEM	KING PART NO.	DESCRIPTION	SPEC	QTY
9	089-6426-04	Bolt	AN4-7A	1
10	090-0234-00	Tee	PMA	1
11	090-0236-01	Hose	MIL-H-5593B-3	1 ft.
12	090-0236-02	Hose	MIL-H-5593B-4	5 ft.
13	090-0240-01	Fitting 3/16	AN773-3D	1
14	090-0240-02	Fitting 1/14	AN773-4D	1
15	090-0253-00	Clamp	PMA	6
16	090-0303-00	Female Tee	PMA	1
17	090-0417-00	Reducer	AN919-2D	1
18	090-0481-00	Hose Nipple	PMA	1

3.1 ADAPTER MODULE INSTALLATION

The KC 190/191/192 requires adapter module installation to tailor the unit for the type system as well as the type airplane.

THE ADAPTER MODULES ARE 40 PIN I.C. TYPE UNITS AND EXTREME CARE MUST BE TAKEN NOT TO DAMAGE THE UNIT DURING THE INSTALLATION OF THESE COMPONENTS.

Given below is a table of adapter modules approved for the Mooney M20J/M20K airplanes. The first step is to insure that the adapters are the correct ones for the system installation being made.

SYSTEMS WITH KG 107 DIRECTIONAL GYRO:

		KAP 100	KAP 100 w/Elec. Trim	KAP 150
M20J	Bottom Adapter	065-5025-10	065-5025-28	065-5025-27
	Top Adapter	065-5026-18	065-5026-13	065-5026-07
M20K	Bottom Adapter	065-5025-11	065-5025-06	065-5025-94
	Top Adapter	065-5026-19	065-5026-12	065-5026-05

3.1 (Cont'd)

SYSTEMS WITH KCS 55A COMPASS SYSTEM:

		KAP 100	KAP 100 w/Elec. Trim	KAP 150	KFC 150
M20J	Bottom Adapter Top Adapter	065-5025-10 065-5026-16	065-5025-28 065-5026-09	065-5025-27 065-5026-06	065-5025-27 065-5026-14
M20K	Bottom Adapter Top Adapter	065-5025-11 065-5026-17	065-5025-06 065-5026-08	065-5025-94 065-5026-04	065-5025-94 065-5026-15

After assuring the correct adapters are available, open the KC 190/191/192 Computer by removing the four screws holding the TOP Cover to the unit. Remove the cover which will expose the Top PC Board in place. Remove the five screws which secure the top PC board. (NOTE: The Top PC Board is hinged to the chassis of the computer. DO NOT REMOVE the two screws holding the board to the plastic hinges.) (See Figure 3-A)

Fold the top board open and with the unit firmly supported, install the appropriate adapter module as follows:

Take the top (RED) adapter and install it in the TOP PC BOARD, as indicated in Figure 3-A, with the "PIN 1" aligned with the RED DOT on the PC board. Use care in installing the adapter to not bend any of the pins.

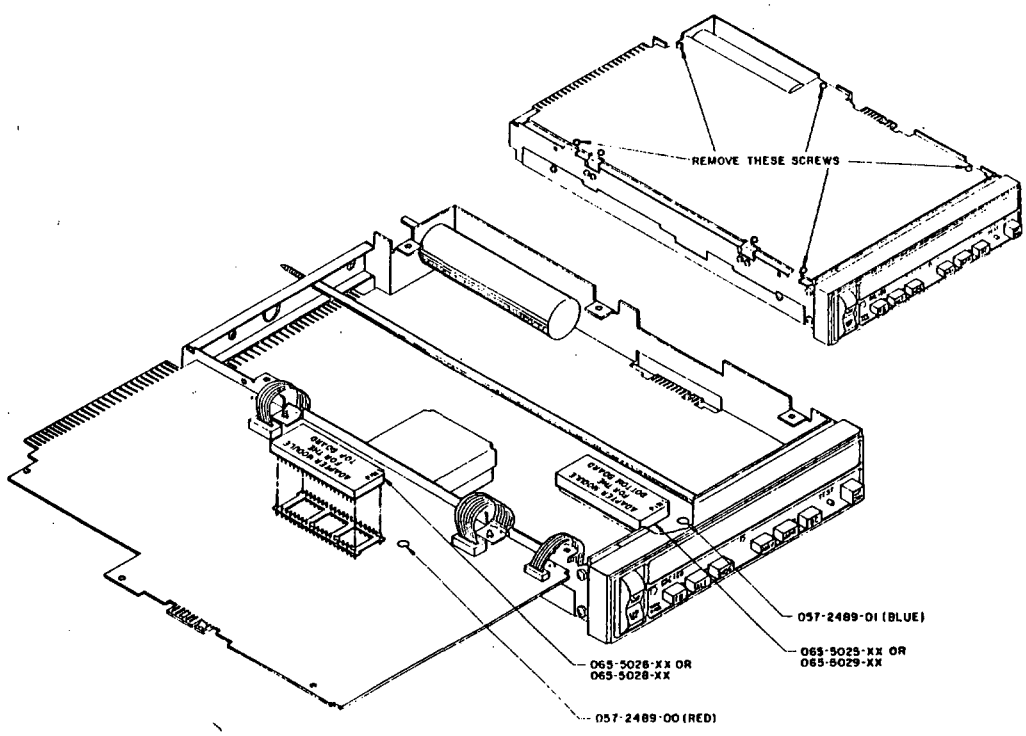


FIGURE 3-A KC 190/191/192 FROM ABOVE WITH TOP COVER AND TOP PC BOARD FOLDED OPEN

3.1 (Cont'd)

Take the bottom (BLUE) adapter and install it in the BOTTOM PC BOARD, as indicated in Figure 3-A, using the same procedure as for the top board.

If the adapters have to be removed from the unit for any reason, use the IC Extractor tool (088-1094-00) to prevent damaging the adapters. This tool is supplied with the KTS 158 Test Set.

After insuring the adapters are properly installed and seated, carefully fold the top board back in place and secure with the five screws which were removed. Reinstall the top cover using the four screws which were removed and the KC 190/191/192 is ready for installation in the panel.

3.2 KC 190/KC 191/KC 192 INSTALLATION

A. The KC 190 Computer Controller is to be installed for the KAP 100 Systems, the KC 191 for the KAP 150 Systems, and the KC 192 for the KFC 150 Systems.

B. The KC 190, KC 191 or KC 192 is to be mounted at the bottom of the radio stack as shown in Figure 3-B. The mounting of the unit is similar to the mounting of any panel mounted radio.

C. Using the terminals (030-1107-80) (Item 3) wire per Section 10 and insert terminals into connectors (030-1094-68) (Item 1) and (030-1094-69) (Item 2). Attach the wired connectors to the inside of the rear of the mounting rack (047-5114-03) supplied with unit using four #4 screws (089-5903-08) (Item 6).

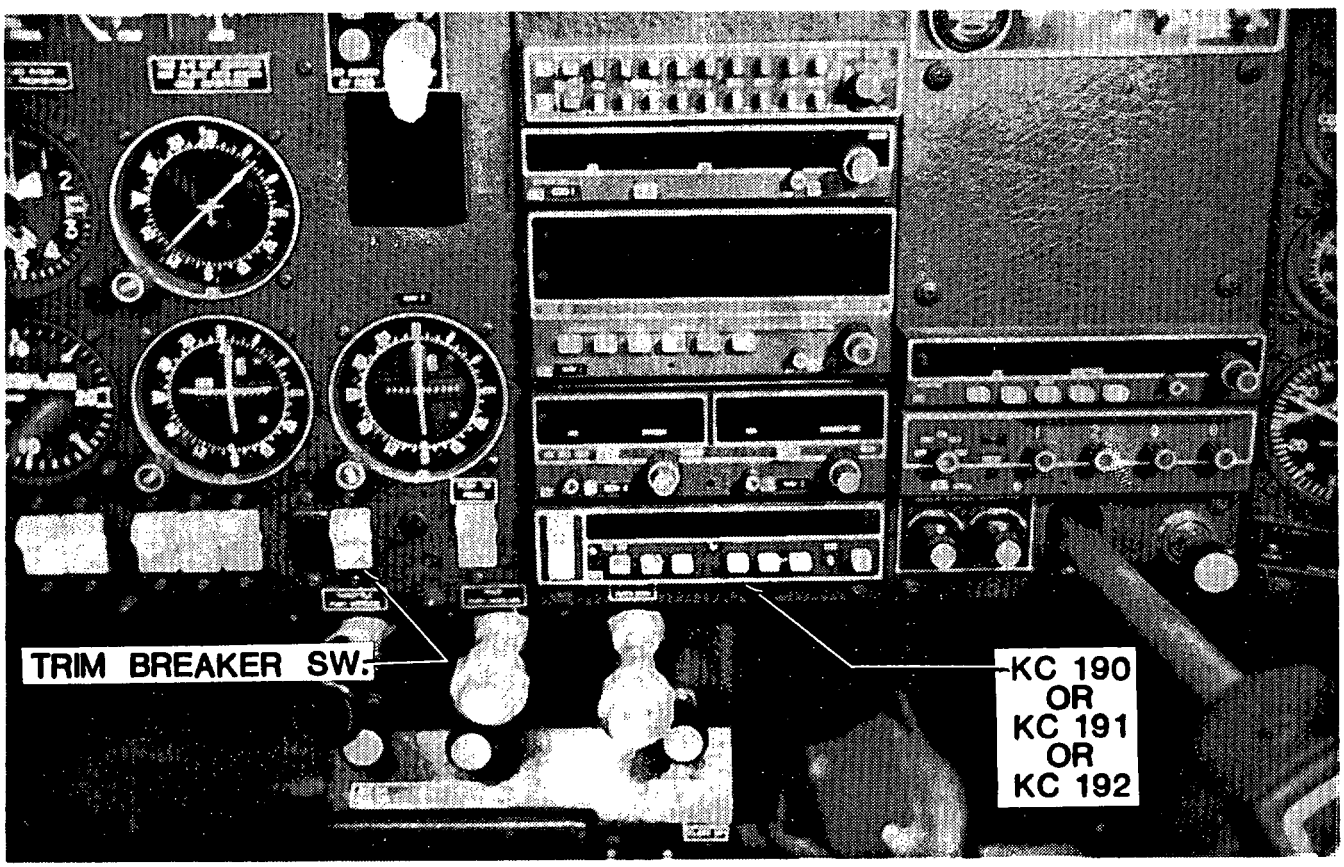


FIGURE 3-B KC 190/191/192 PANEL LOCATION

3.2 (Cont'd)

D. Using four #6 screws (089-6012-08) (Item 7) and four nut clips (089-2353-01) (Item 5) attach the wired mounting rack to the radio stack structure, and insert the KC 190, KC 191 or KC 192.

E. After the KC 191 or KC 192 has been installed in the rack, connect the pneumatic line as shown in Figure 3-C. (The KC 190 does not require the pneumatic line connection.)

NOTE

FAA REGULATIONS (REF. 91.170) REQUIRE THAT ANY LEAKAGE TEST PREVIOUSLY CONDUCTED ON THE PITOT-STATIC SYSTEM MUST BE RECONDUCTED OR AN APPROPRIATE ENTRY MADE IN THE AIRCRAFT LOG BOOK THAT CLEARLY STATES THAT THE PREVIOUS LEAKAGE TESTS ARE NO LONGER VALID.

NOTE

THE KC 190, KC 191 AND KC 192 REQUIRE FORCED AIR COOLING FOR PROPER OPERATION. A COOLING FAN MUST BE INSTALLED WITH ONE AIR DUCT RUNNING TO THE LARGER PORT ON THE REAR OF THE KC 190, KC 191 OR KC 192 MOUNTING RACK. A HOSE (150-0038-00) (ITEM 8) AND CLAMP (090-0253-01) (ITEM 4) ARE SUPPLIED WITH THE KC 19X INSTALLATION KIT FOR THE PURPOSE OF CONNECTING THE FORCED AIR COOLING.

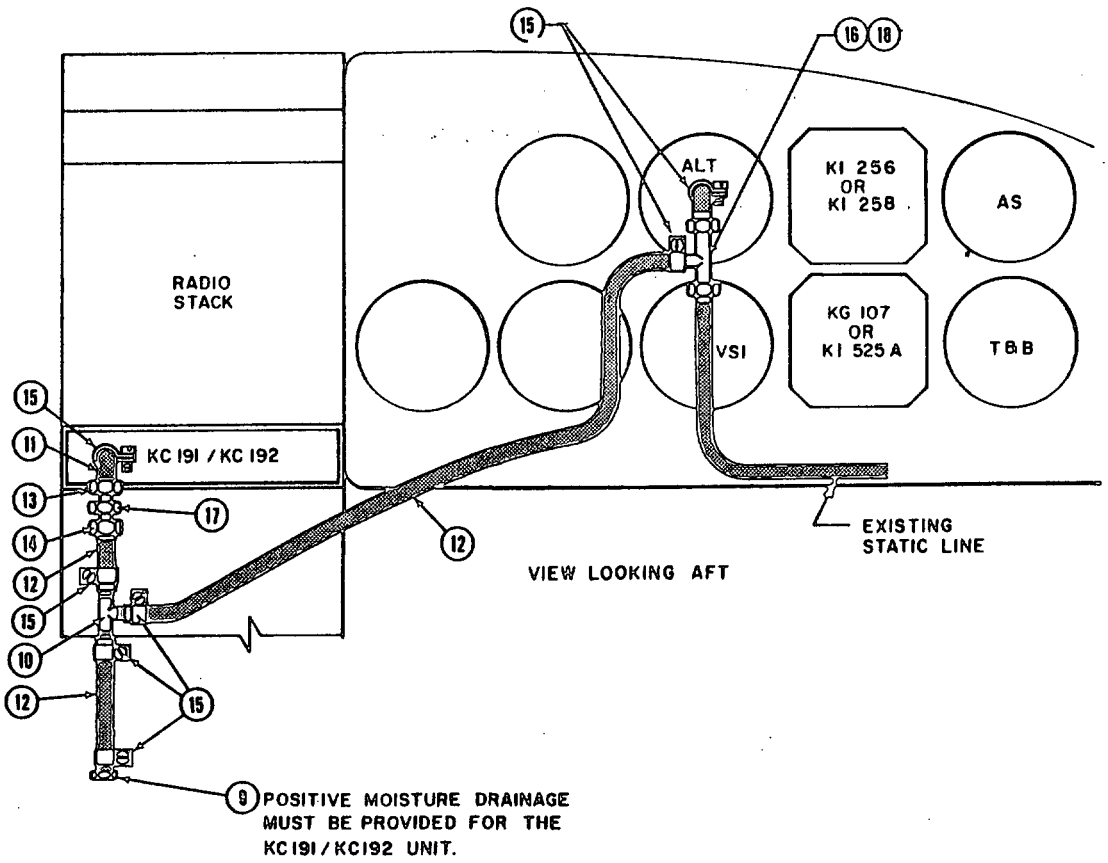


FIGURE 3-C PNEUMATIC PLUMBING

4.0 SWITCH AND CIRCUIT BREAKER INSTALLATION

The Cockpit Installation Kit 050-1960-00 consists of the following:

ITEM	KING PART NO.	DESCRIPTION	SPEC	QTY
1	057-2543-00	Mic Decal	PMA	1
2	088-1093-00	Switch Cap Base Plate	PMA	1
3	089-6081-07	Screw 4-40 x 7/16	PMA	2
4	089-6159-05	Screw 2-56 x 5/16	PMA	2
5	200-2959-00	Switch Cap Ass'y.	PMA	1
6	200-2960-00	Trim Switch Ass'y.	PMA	1

4.1 CONTROL WHEEL SWITCHING INSTALLATION

A. For KAP 100 Systems that are not equipped with the optional electric pitch trim control, there are no switches installed. For KAP 100 Systems with optional electric pitch trim control, KAP 150 Systems and KFC 150 Systems, install the switching as described in the following text.

B. Remove the plate that covers the left grip of the pilot's control wheel and discard.

4.1 (Cont'd)

C. Fit the Base Plate (088-1093-00) (Item 2) on the left grip of the pilot's control wheel. (For Mooney models, the slotted tab on the bottom of the plate must be trimmed away to clear the existing MIC switch.)

D. Insert, but do not fasten, the Trim Switch Ass'y (200-2960-00) (Item 6) into the Switch Cap Ass'y (200-2959-00) (Item 5) from above as shown in Figure 4-A. Route all wires from the switches through the cut-out in the Base Plate, down through the left grip of the wheel to the hub, and out forward through the yoke.

E. Remove the Trim Switch from the Switch Cap Ass'y only far enough to allow fastening the Switch Cap Ass'y and Base Plate to the control wheel using two #4 screws (089-6081-07) (Item 3). After fastening, replace the Trim Switch in the Switch Cap Ass'y and secure using two #2 screws (089-6159-05) (Item 4) as shown in Figure 4-A. Wire the switches per Section 10.

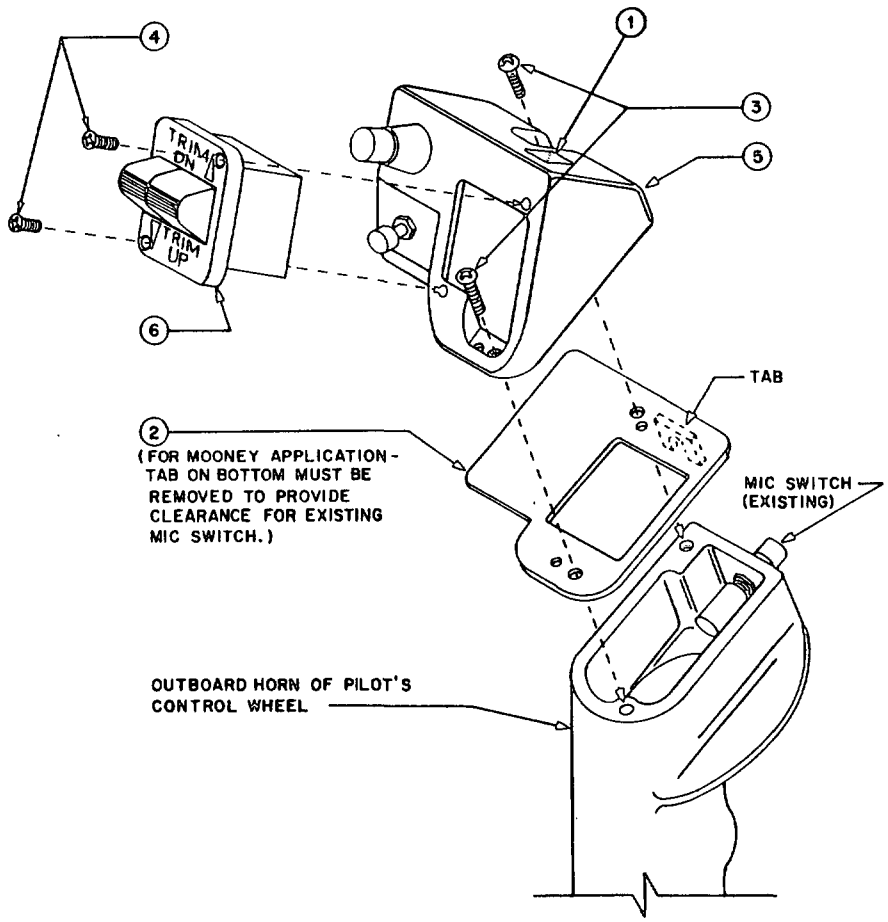


FIGURE 4-A SWITCH CAP INSTALLATION

4.2 CIRCUIT BREAKER INSTALLATION

A. For KAP 100 Systems that are not equipped with the optional electric pitch trim control there is one 5 amp pullable circuit breaker (labeled AUTOPILOT). For KAP 100 Systems that are equipped with the optional electric pitch trim control, KAP 150 Systems and KFC 150 Systems there are two circuit breakers installed, one 10 amp pullable circuit breaker (labeled AUTOPILOT) and one 5 amp switchable breaker (labeled TRIM). See Ordering Sheets for Mooney P/N of the panel mounted switchable trim breaker.

B. Install the breakers in the locations shown in Figure 4-B and Figure 3-B and wire per Section 10.

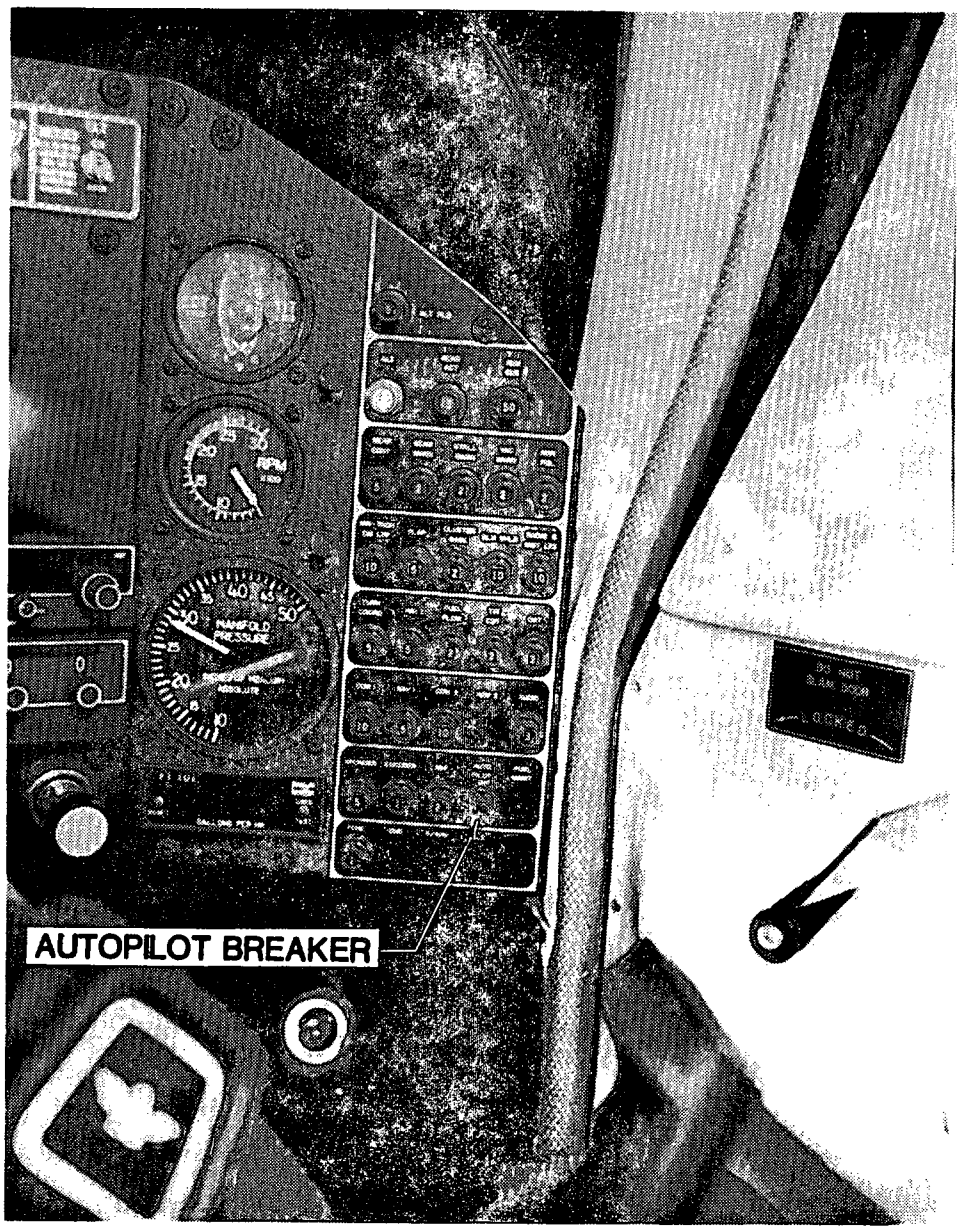


FIGURE 4-B CIRCUIT BREAKER LOCATION

5.0 SLIP CLUTCH VALUES AND CAPSTAN DIRECTION

A. Servo slip clutch torque settings are adjustable and must be set to the appropriate value shown in Figure 5-A prior to servo installation. The fixtures and tools required to perform the clutch adjustments are supplied with the KTS 158 Autopilot Tester (071-5064-00).

MOONEY AIRCRAFT MODEL NO.	SERIAL NO.	PITCH SERVO PART NO.	ACFT. NOSE UP CAPSTAN DIRECTION	SLIP CLUTCH TORQUE (IN/LB)	ROLL SERVO PART NO.	ACFT. ROLL RT. CAPSTAN DIRECTION	SLIP CLUTCH TORQUE (IN/LB)	PITCH TRIM SERVO PART NO.	ACFT. NOSE UP CAPSTAN DIRECTION	SLIP CLUTCH TORQUE (IN/LB)
M 20 J	ALL 14 VDC	065-0050-04	CW	21 ± 2	065-0051-01	CCW	20±2	065-0052-04	CCW	20±2
M 20 K	ALL 14 VDC	065-0050-04	CW	21 ± 2	065-0051-02	CCW	20±2	065-0052-04	CCW	21±2
M 20 J	ALL 28 VDC	065-0050-04	CW	21 ± 2	065-0051-01	CCW	20 ± 2	065-0052-14	CCW	20 ± 2
M 20 K	ALL 28 VDC	065-0050-04	CW	21 ± 2	065-0051-02	CCW	20 ± 2	065-0052-14	CCW	21 ± 2

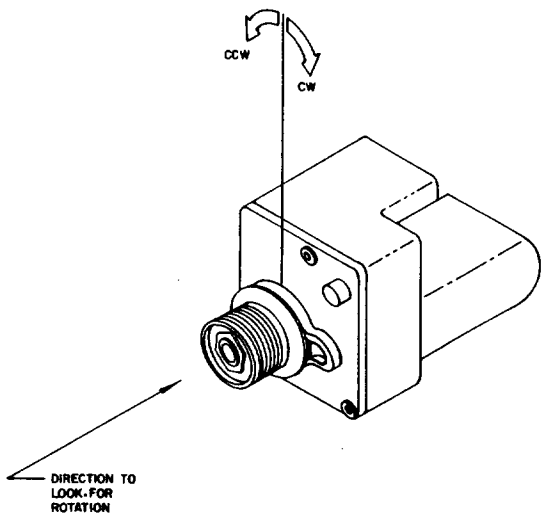


FIGURE 5-A SLIP CLUTCH VALUES & CAPSTAN DIRECTION

B. Remove the cable guards from the servo and attach it to the Test Stand (047-4238-01) as shown in Figure 5-B. Place the appropriate Adapter (071-1260-04, 071-6021-03 or 071-6066-02) over the capstan and secure by inserting the Adapter Pin(s) (071-6021-03 or 071-6065-00). (See Figure 5-B.)

C. Insert a torque wrench (Snap-on TEP-6FUA or equivalent) into the slot on the top of the Test Stand and attach the socket end to the Adapter. Apply power to the servo by joining the servo connector to the test set connector.

D. Using the appropriate switch on the Test Set, turn the servo motor on in the CW direction and record the torque reading on the wrench. Repeat this step in the CCW direction.

NOTE

THE DESIRED TORQUE READING IS THE AVERAGE OF THE MAXIMUM AND MINIMUM READINGS OBTAINED FROM THE CW AND CCW ROTATIONS.

THIS TEST SHOULD BE REPEATED THREE (3) TIMES IN EACH DIRECTION AND THEN THE AVERAGE OF THE SIX (6) READINGS IS USED TO DETERMINE THE TRUE TORQUE READING.

E. If the level measured falls below the desired value, rotate the clutch adjust nut clockwise. If the level measured falls above the desired value, rotate the clutch adjust nut counterclockwise. After an adjustment, repeat the torque test.

F. After wiring has been completed and the servos installed, verify the direction of rotation of the servo capstans as shown in Figure 5-A.

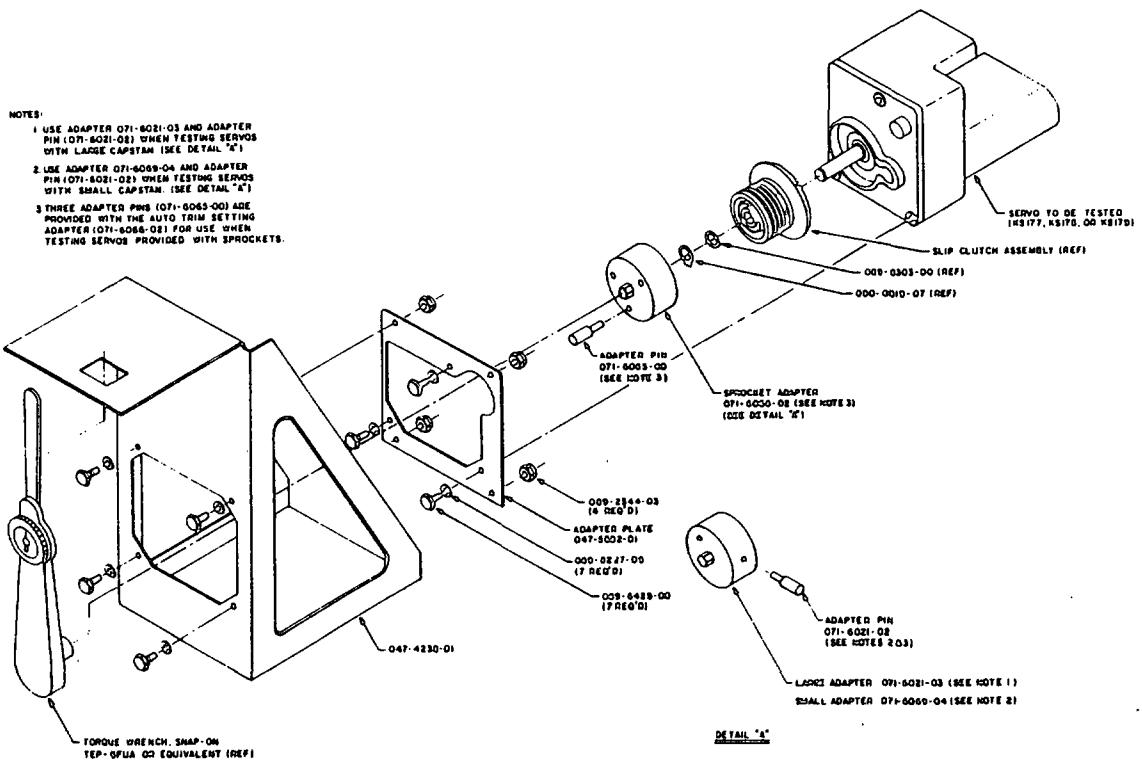


FIGURE 5-B SERVO SLIP CLUTCH ADJUSTMENT

6.0 ROLL SERVO AND ALERTER INSTALLATION

This section applies to the installation of the KS 178 Unit.

The KS 178 Unit Installation Kit 050-1817-00 consists of the following:

ITEM	KING PART NO.	DESCRIPTION	SPEC	QTY
1	030-1008-00	Lvr/Pvt Ass'y	PMA	2
2	030-1009-00	Hood Conn	PMA	1
3	030-2000-00	Conn 14 Pin FFM	PMA	1
4	089-5393-07	Bolt	PMA	3
5	089-8227-09	Washer	PMA	3

The Roll Servo Installation Kit 050-1962-00 consists of the following:

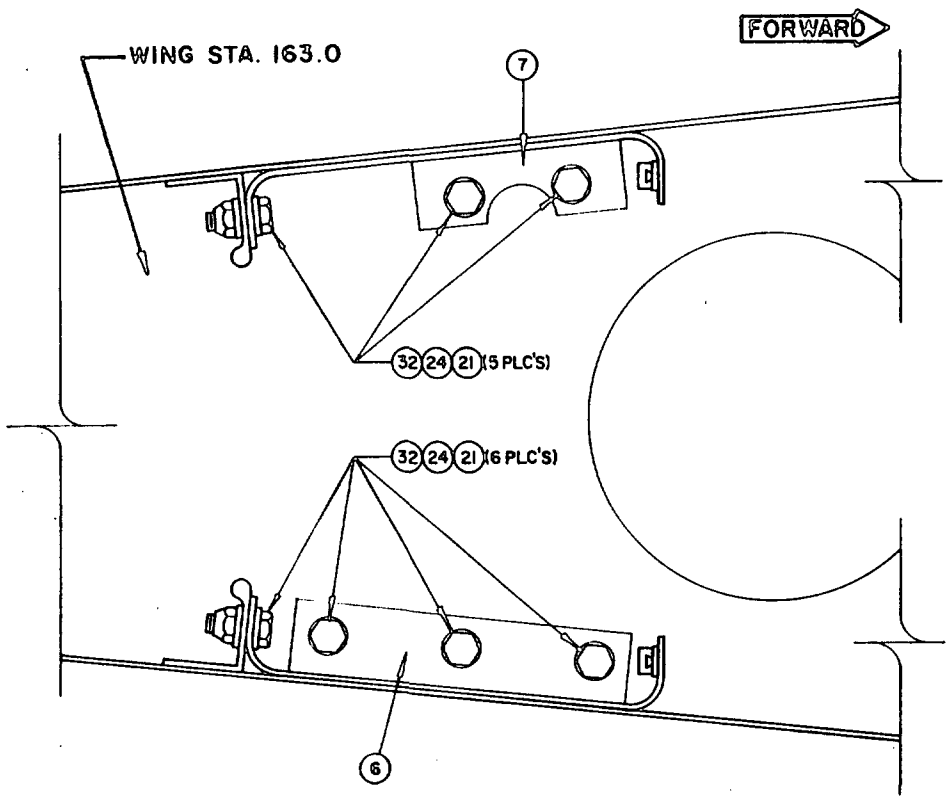
ITEM	KING PART NO.	DESCRIPTION	SPEC	QTY
6	047-6089-02	Bottom Roll Support	PMA	1
7	047-6088-02	Top Roll Support	PMA	1
8	047-4123-01	Pulley Bracket Sprt	PMA	1
9	047-4124-01	Pulley Bracket	PMA	1
10	047-4124-03	Pulley Bracket	PMA	1
11	047-5908-01	Roll Mtg. Brkt	PMA	1
12	047-4140-00	Pulley Bracket Ass'y	PMA	1
13	047-4153-01	Angle Bracket	PMA	1
14	047-4607-01	Brkt Shim	PMA	1
15	071-1129-00	Roll Cable Ass'y	PMA	1
16	076-0970-01	Pulley Spcr	PMA	2
17	076-0970-03	Pulley Spcr	PMA	2
18	089-2330-02	Nut Plate	MS27107-832	1
19	089-2334-02	Nut	AN320-C3	1
20	089-2344-02	Nut	AN365-832	5
21	089-2344-03	Nut	AN365-1032	18
22	089-2344-04	Nut	AN365-428	4
23	089-6421-06	Screw	MS27039-0809	5
24	089-6425-01	Bolt	AN3-4A	16
25	089-6425-00	Bolt	AN3-3A	9
26	089-6425-03	Bolt	AN3-6A	2
27	089-7040-05	Bolt	AN3-10	1
28	089-6426-05	Bolt	AN4-10A	2
29	089-6426-08	Bolt	AN4-13A	2
30	089-8227-07	Washer	AN960-8	4
31	089-8227-08	Washer	AN960-10L	2
32	089-8227-09	Washer	AN960-10	47
33	089-8227-10	Washer	AN960-416L	6
34	089-8227-11	Washer	AN960-416	16
35	090-0220-00	Pulley	MS20219-1	3
36	090-0252-03	Pulley Grd	NAS427-9	2
37	090-0252-10	Pulley Grd	NAS427-16	2
38	090-0323-00	Cotter Pin	MS24665-132	1
39	092-5012-34	Rivet	MS20426-AD3-4	2
40	092-5043-00	Rivet	CR2249-4-4	2
41	076-0970-09	Pulley Spacer	PMA	1
42	090-0220-01	Pulley	MS20219-2	1
43	089-6425-04	Bolt	AN3-7A	1
44	038-0008-00	Sonalert	PMA	1

A. The KS 178 Roll Servo is to be installed for KAP 100 Systems, KAP 150 Systems, and KFC 150 Systems. The KS 178 Roll Servo is located in the right wing between Sta. 163.0 and Sta. 178.27. Access is through the access panels on the bottom side of the wing. Adjust the slip clutch of the capstan to the value shown in Section 5.0 (Page 5-1). See Figure 5-A for adjustment procedure of clutch.

6.0 (Cont'd)

B. Take the Top Roll Support (047-6088-02) (Item 7) and place it up in the wing against Sta. 163.0 and the aft stringer. Match drill two .191 dia. holes through the short flange at Sta. 163.0, and three .191 dia. holes through the aft flange and the stringers. Special care must be taken to ensure the holes are centered on the aft side of the stringer between the rolled edge and the top angle of the stringer. Secure with five bolts (089-6425-01) (Item 24), five nuts (089-2344-03) (Item 21), and ten washers (089-8227-09) (Item 32). (See Figure 6-A).

C. Drill out two rivets holding the inspection hole reinforcing ring to the wing skin for clearnace and place the Bottom Roll Support (047-6089-02) (Item 6) in the wing in the same manner as the top bracket. With the bottom Roll Bracket in place, match drill one .193 dia. hole up thru the wing access plate mounting hole (existing nut plate must be removed) and the bracket. Remove the bracket and counter sink the bottom side of the hole, then install one nut plate (089-2330-02) (Item 18) to the top side of the bracket using two rivets (092-5012-34) (Item 39) and reinstall in the airplane. Match drill three .191 dia. holes through the short flange at Sta. 163.0 and three .191 dia. holes through the aft flange and the stringers. Special care must be taken to ensure the holes are centered on the aft side of the stringer between the rolled edge and the bottom angle of the stringer. Secure with six bolts (089-6425-01) (Item 24), six nuts (089-2344-03) (Item 21) and twelve washers (089-8227-09) (Item 32). Match drill two .146 dia. holes up through the previously drilled out rivet holes and the bottom roll support. Fasten with two Rivets (092-5043-00) (Item 40).



VIEW LOOKING INBOARD

FIGURE 6-A ROLL SUPPORT

6.0 (Cont'd)

D. Attach the KS 178 Roll Servo to the Roll Mounting Bracket (047-5908-01) (Item 11) with three bolts (089-6425-00) (Item 25) and three washers (089-8227-09) (Item 5). Remove the two cable guards attached to the unit and insert the positioning ball of the Roll Cable Ass'y (071-1129-00) (Item 15) in the capstan with the ball facing straight outboard (toward the mounting bracket flange). Wrap the cable around the capstan as shown in Figure 6-B. The end of the cable with the closed cable fork must be routed over the top of the capstan and then inboard. Replace the cable guards with one located at the top and one at the bottom as shown in Figure 6-B. Safety wire the guard posts to the attaching screws as shown.

E. Place the Roll Mounting Bracket (047-5908-01) (Item 11) with servo attached, into the wing access panel and attach to the Roll Support Brackets (047-6088-02 & 047-6089-02) (Item 7)(Item 6) using six bolts (089-6425-00) (Item 25), and six washers (089-8227-09) (Item 32) as shown in Figure 6-B.

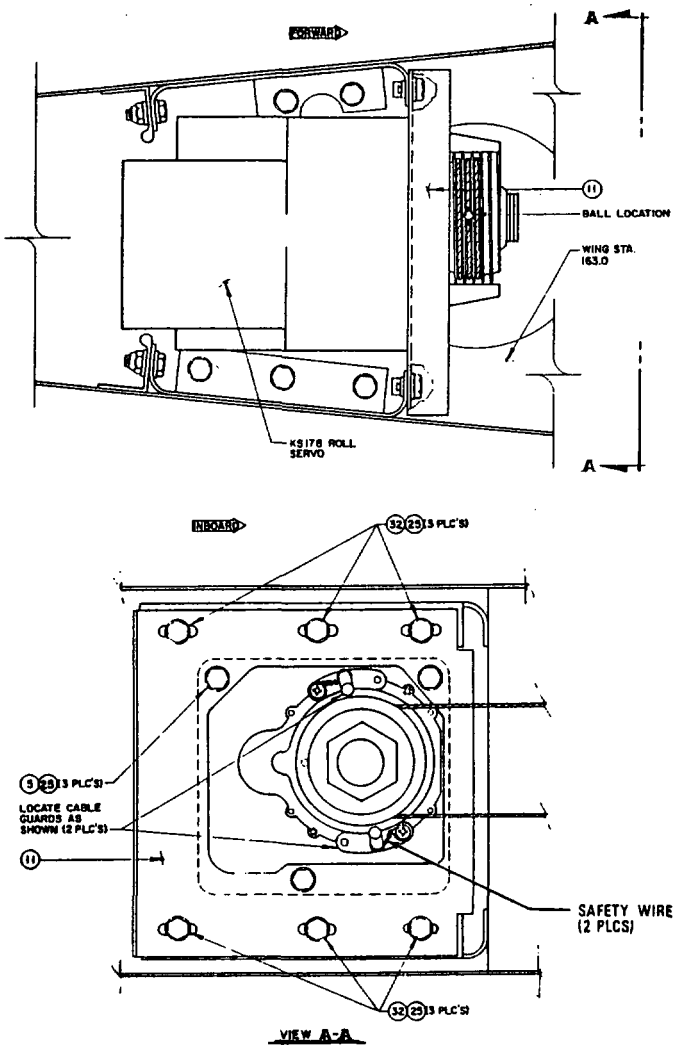


FIGURE 6-B ROLL MOUNT AND CABLE WRAP

6.0 (Cont'd)

F. Take the Pulley Bracket Ass'y (047-4140-00) (Item 12) and install one pulley (090-0220-00) (Item 35) in the upper position and one pulley (090-0220-01) (Item 42) in the lower position with two bolts (089-6425-05) (Item 22), two nuts (089-2344-04) (Item 22) and four washers (089-8227-11) (Item 34). (See Figure 6-C.)

G. Place the assembly up on the inboard side of Wing Sta. 163.0 The wider end of the bracket must be facing aft. On the forward side of the assembly, line up the existing hole in the wing rib with the existing hole in the bracket and secure with a bolt (089-6425-03) (Item 26), nut (089-2344-03) (Item 21) and two washers (089-8227-09) (Item 32) with one spacer (076-0970-01) (Item 16) between the bracket and the rib.

H. Line the double pulley assembly up by pivoting the pulley bracket in such a manner that the bridle cables are as close to the pulleys as possible. This alignment will provide for the proper positioning of the aft end of the bracket. Match drill two .191 dia. holes through the wing rib, placing a spacer (076-0970-01) (Item 16) between the bulkhead and assembly at the lower aft hole location. Secure with a bolt (089-6425-03) (Item 26), nut (089-2344-03) (Item 21), and two washers (089-8227-09) (Item 32). Place a spacer (076-0970-09) (Item 41) between the bulkhead and assembly at the upper aft hole location and secure with one bolt (089-6425-04) (Item 43), one nut (089-2344-03) (Item 21) and two washers (089-8227-09) (Item 32).

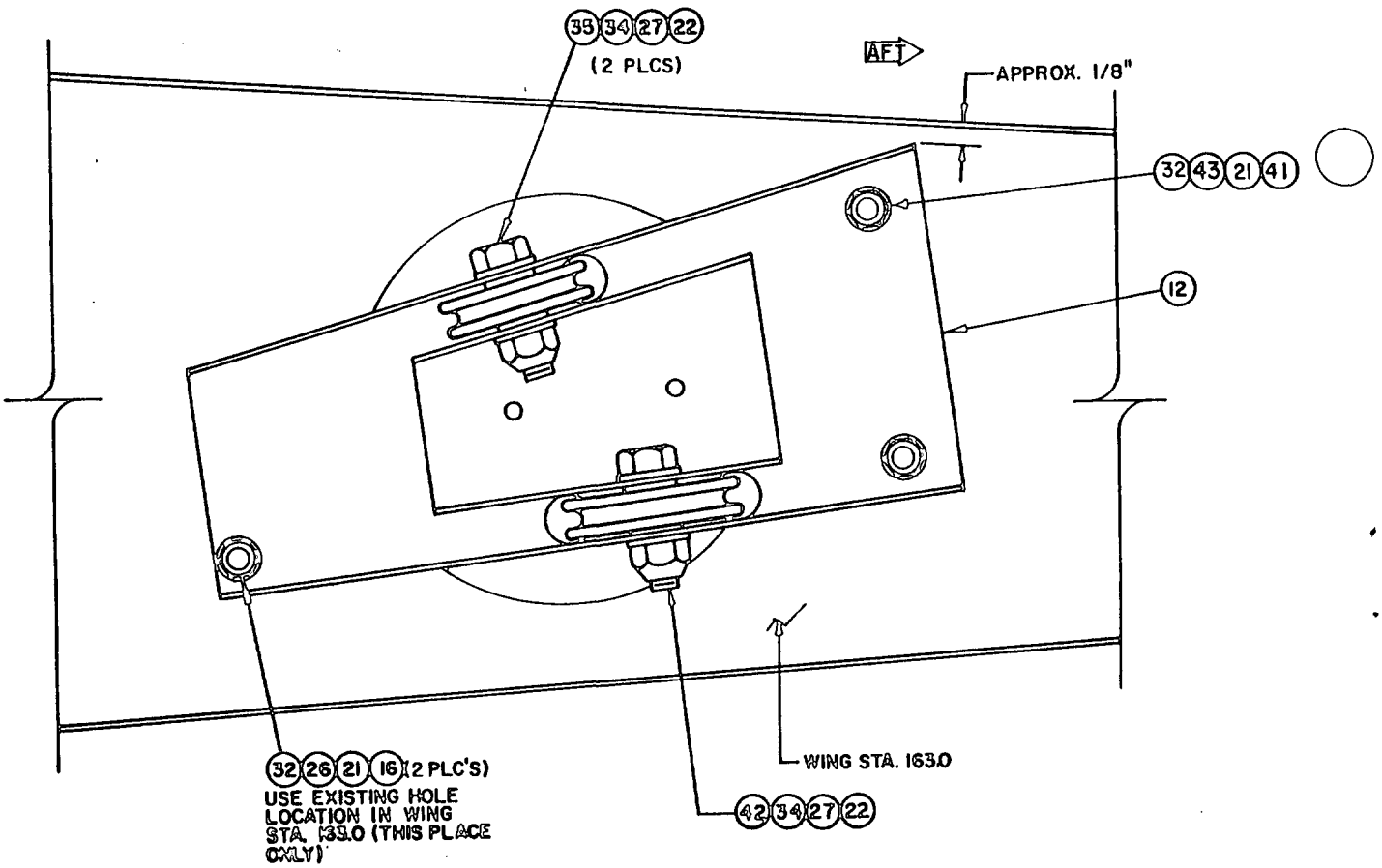
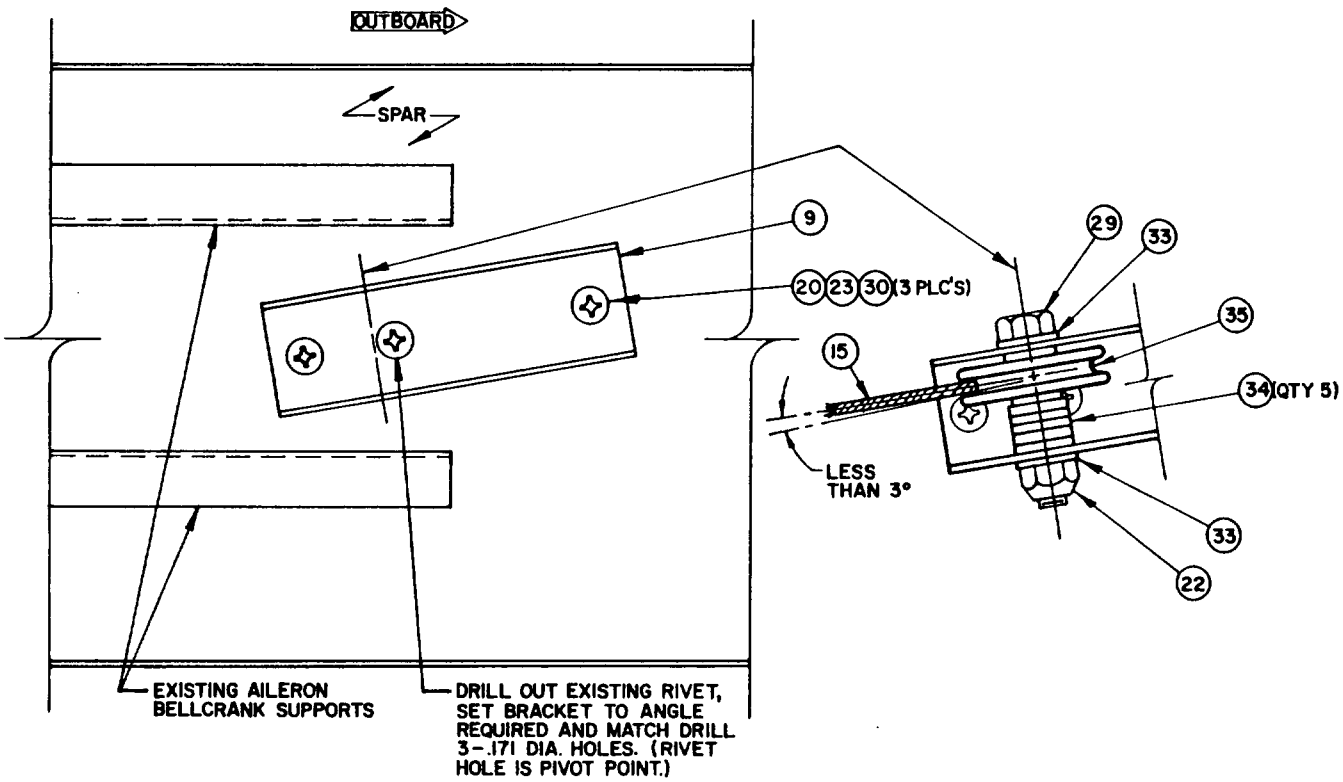


FIGURE 6-C OUTBOARD ROLL PULLEYS

6.0 (Cont'd)

I. Drill out the existing rivet on the forward spar that is between the existing bellcrank support brackets using a .171 dia. drill as shown in Figure 6-D. Attach the bracket (047-4124-01) (Item 9) to the spar using one screw (089-6421-06) (Item 23), one washer (089-8227-07) (Item 30) and one nut (089-2344-02) (Item 20) through the middle hole of the bracket with the nut on the forward side of the spar. Assemble the forward pulley bracket (047-4124-01) (Item 9) as shown in Figure 6-D using pulley (090-0220-00) (Item 35), bolt (089-6426-08) (Item 29), washers (089-8227-11) (Item 34), washers (089-8227-10) (Item 33) and nut (089-2344-04) (Item 22). Run the end of the cable with the closed fitting through the pulley and using the previously installed screw as a pivot point, adjust the angle of the bracket so that the bridal cable is at a pay-off angle of LESS THAN 3° with the pulley. (A pay-off angle greater than 3° may cause the cable to "walk" off the edge of the pulley as it runs through it's travel.) (See Figure 6-D.) After the correct pay-off angle is achieved, match drill the spar from the holes on each side of the pulley bracket pivot point using a .171 dia. drill. Secure the outboard end of the bracket using one screw (089-6421-06) (Item 23), one nut (089-2344-02) (Item 20) and one washer (089-8227-07) (Item 30).



VIEW LOOKING FORWARD

FIGURE 6-D FORWARD ROLL PULLEY

6.0 (Cont'd)

J. Place the Angle Bracket (047-4153-01) (Item 13) on the forward side of the spar so that the angle is over the remaining bracket inboard mounting hole as shown in Figure 6-E, and mark for drilling. Remove angle bracket and drill with .171 dia. drill. Replace and secure with one screw (089-6421-06) (Item 23), one nut (089-2344-02) (Item 20), one washer (089-8227-07) (Item 30).

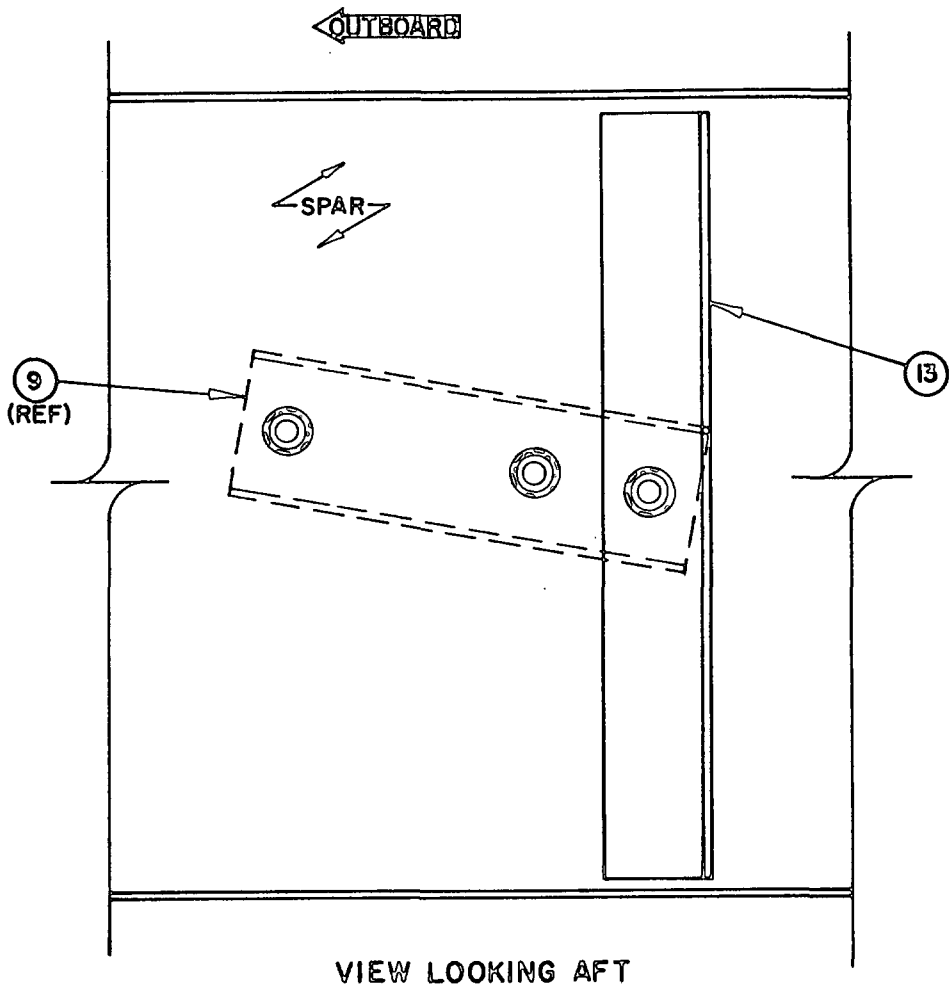
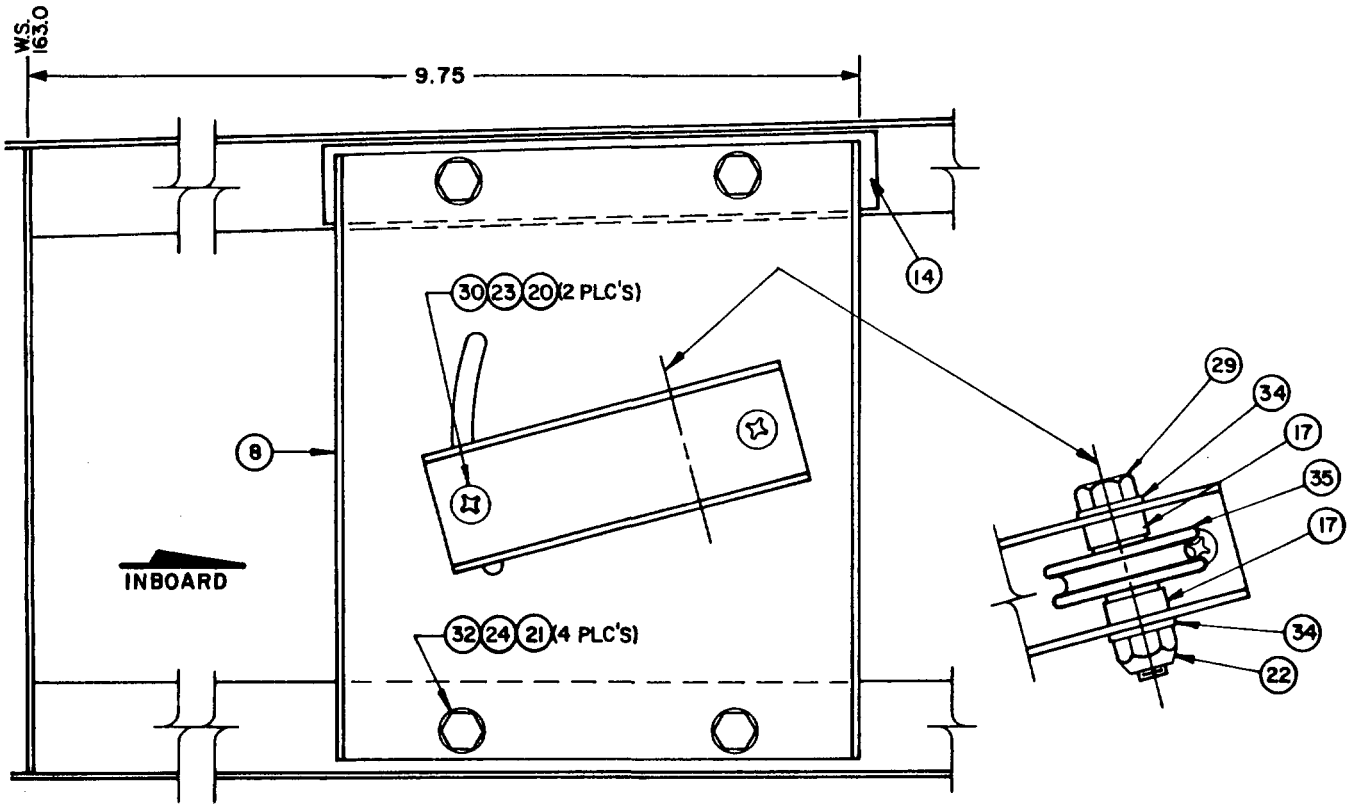


FIGURE 6-E ANGLE BRACKET

6.0 (Cont'd)

K. Mount the Aft Pulley Bracket (047-4124-03) (Item 10) to the Pulley Bracket Support (047-4123-01) (Item 8) with two screws (089-6421-06) (Item 23), two nuts (089-2344-02) (Item 20) and four washers (089-8227-07) (Item 30) as shown in Figure 6-F.

L. Place the assembly with the mounting holes at the top and bottom, against the aft top and bottom stringers. The inboard edge of the support at the top is 9.75" from wing Sta. 163.0 (measured at the top). Match drill four .191 dia. holes through the stringers and place the Bracket Shim (047-4607-01) (Item 14) between the top of the assembly and the top stringer. Secure with four bolts (089-6425-01) (Item 24), four nuts (089-2344-03) (Item 21), and eight washers (089-8227-09) (Item 32).



VIEW LOOKING AFT

FIGURE 6-F AFT ROLL PULLEY

6.0 (Cont'd)

M. Attach both ends of bridle cable at the bellcrank per Figure 6-G. Use three washers (089-8227-09) (Item 32) below the cable ends and two washers (089-8227-09) (Item 32) above the cable ends. Secure with one bolt (089-6425-05) (Item 27), one castellated nut (089-2334-02) (Item 19), two washers (089-8227-08) (Item 31) and one cotter pin (090-0323-00) (Item 38).

N. Install the aft pulley (090-0220-00) (Item 35) by placing the cable in the pulley-slot with the two spacers (076-0970-03) (Item 17) on either side of the pulley and inserting in the pulley mounting bracket (047-4124-03) (Item 10). Secure with one bolt (089-6426-08) (Item 29), one nut (089-2344-04) (Item 22) and two washers (089-8227-10) (Item 33).

O. Adjust the pulley in the slot until the payoff angle of the cable between the aft pulley and the pulley mounted at wing Sta. 163.0 is within three degrees and tighten hardware.

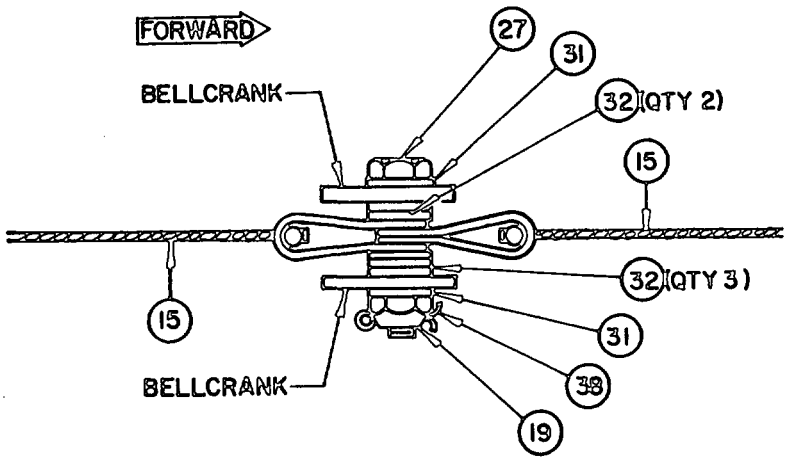


FIGURE 6-G BRIDLE CABLE ATTACHMENT

6.0 (Cont'd)

P. Set the bridle cable tension to 15 ±2 lbs by inboard/outboard adjustment of the Roll Mounting Bracket.

Q. Install all Pulley Guards per Figure 6-H at each pulley where not previously installed.

R. Using the connector (030-2000-00) (Item 3), hood (030-1009-00) (Item 2) and Lever and Pivot Assembly (030-1008-00) (Item 1) provided, connect the wiring to the servo as shown in Section 10.

S. The Sonalert (038-0008-00) (Item 44) will be required for all systems. It is located in the pilot's overhead speaker area.

T. Insert the sonalert from the back of the panel and secure by threading on the sonalert attaching ring. Wire per Section 10.

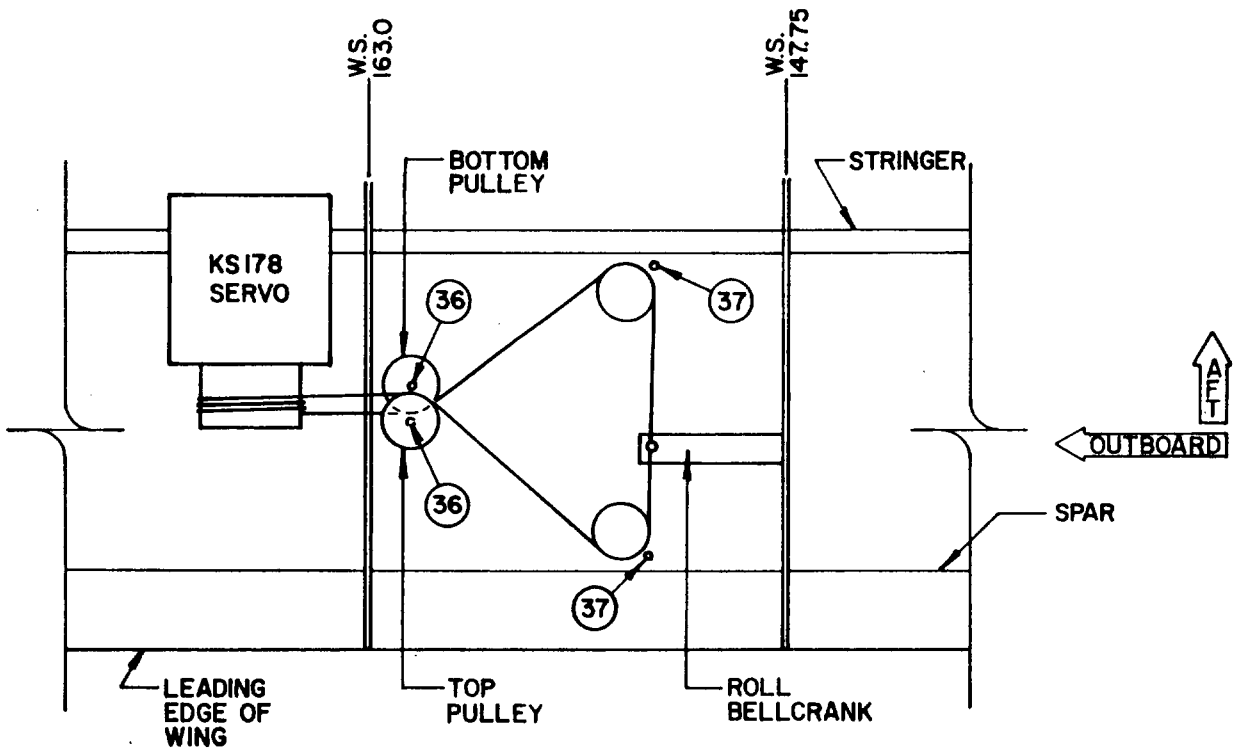


FIGURE 6-H PULLEY GUARD LOCATION

7.0 PITCH TRIM SERVO INSTALLATION

This section applies to the installation of the KS 179 unit.

The KS 179 Unit Installation Kit 050-1817-00 consists of the following:

ITEM	PART NUMBER	DESCRIPTION	SPEC	QTY
1	030-1008-00	Lvr/Pvt Ass'y	PMA	2
2	030-1009-00	Hood Conn	PMA	1
3	030-2000-00	Conn 14 Pin FFM	PMA	1
4	089-5393-07	Bolt	PMA	3
5	089-8227-09	Washer	PMA	3

The Trim Servo Installation Kit 050-1964-00 consists of the following:

ITEM	PART NUMBER	DESCRIPTION	SPEC	QTY
6	047-5866-01	Trim Mounting Bracket	PMA	1
7	047-4135-01	Trim Bracket Support - Bottom	PMA	1
8	047-4136-01	Trim Bracket Support - Top	PMA	1
9	047-5852-01	Trim Mounting Plate	PMA	1
10	076-0971-00	Sleeve Trim Rod	PMA	1
11	090-0052-22	Roll Pin	PMA	1
12	047-4143-00	Bearing Assembly	PMA	1
13	028-0031-00	Trim Spur Gear	PMA	1
14	090-0312-21	Clevis Pin	PMA	1
15	090-0323-00	Cotter Pin	PMA	1
16	089-6425-01	Bolt	AN3-4A	7
17	089-2344-03	Nut	AN365-1032	15
18	089-8227-09	Washer	AN960-10	58
19	089-6419-11	Screw	AN23-19	4
20	089-6531-02	Screw	AN525-832-R8	8
21	089-2344-02	Nut	AN365-832	8
22	089-8227-07	Washer	AN960-8	8
23	090-0418-00	Trim Drive Chain	PMA	1
24	090-0295-00	Master Link	PMA	1
25	090-0052-23	Roll Pin	PMA	1
26	089-6425-03	Bolt	AN3-6A	4
27	089-6425-00	Bolt	AN3-3A	3

A. The KS 179 Pitch Trim Servo is to be installed for KAP 100 Systems with the optional electric pitch trim control, KAP 150 Systems, and KFC 150 Systems. The KS 179 Pitch Trim Servo is not installed for KAP 100 Systems without the optional electric pitch trim control. The KS 179 Pitch Trim Servo Assembly is located just aft of Sta. 125.3 in the fuselage. Adjust the slip clutch of the capstan to the value shown in Section 5.0 (Page 5-1). See Figure 5-B for adjustment procedure of clutch.

B. It is necessary to first remove the trim tube from the airplane by disconnecting the universal joint at the forward end of the trim tube. Remove the two pins and pull the tube away from the U-joint.

C. Take the sleeve (076-0971-00) (Item 10) and slip it over the forward end of the trim tube (with hole in sleeve positioned aft). Position the sleeve so that the forward end of the sleeve is .825" aft of the end of the tube. Drill a .187 diameter pilot hole through the sleeve and tube and secure with a 1.00" long Roll Pin (090-0052-22) (Item 11) as shown in Figure 7-A.

D. Slip the Bearing Assembly (047-4143-00) (Item 12) over the sleeve and then the Trim Mounting Bracket (047-5866-01) (Item 6) over the tube. Secure the bearing assembly to the bracket with four screws (089-6419-11) (Item 19), four nuts (089-2344-03) (Item 17) and eight washers (089-8227-09) (Item 18). Note that the bracket flange must be facing aft as shown in Figure 7-A.

E. Slip the Trim Spur Gear (028-0031-00) (Item 13) onto the tube with the gear facing aft. Transfer drill two .1285 diameter holes through the gear and tube. Reinstall the trim tube in the airplane and secure the gear, tube and U-joint end with one clevis pin (090-0312-21) (Item 14) and one cotter pin (090-0323-00) (Item 15) at the forward hole and one roll pin (090-0052-23) (Item 25) at the remaining hole as shown in Figure 7-A.

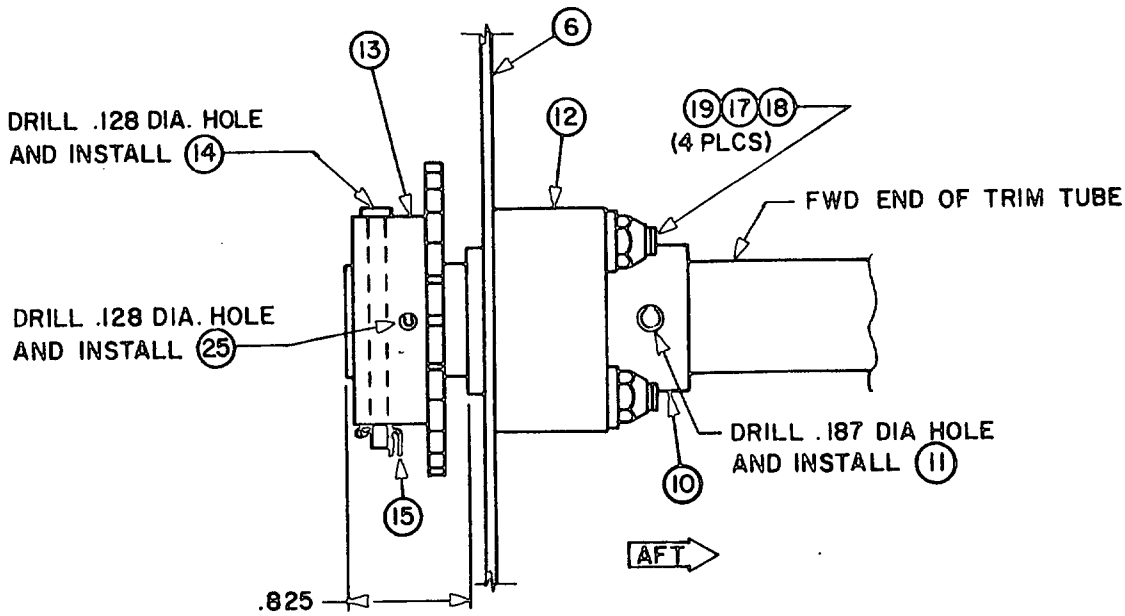


FIGURE 7-A TRIM TUBE BEARING AND SPUR GEAR

F. At the bottom center of Sta. 125.3, remove the five existing screws in the bulkhead. Attach the Bottom Trim Bracket Support (047-4135-01) (Item 7) to the trim bracket with the support angle against the bulkhead. Secure the support to the bracket with four bolts (089-6425-01) (Item 16), four nuts (089-2344-03) (Item 17) and eight washers (089-8227-09) (Item 18). Do not fully tighten the bolts as several adjustments for position will be required as shown in Figure 7-B.

G. Clamp the Bottom Trim Bracket Support to the bulkhead and match drill five .171 diameter holes through the holes and support angle. Secure with five screws (089-6531-02) (Item 20), five nuts (089-2344-02) (Item 21), and five washers (089-8227-07) (Item 22) as shown in Figure 7-B.

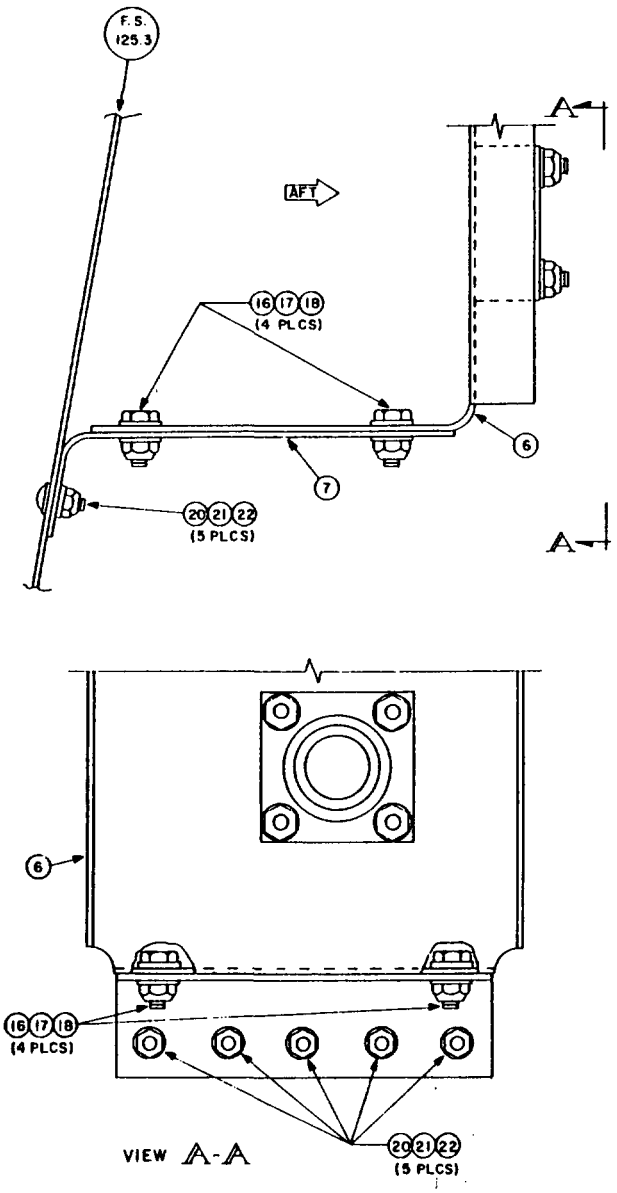


FIGURE 7-B BOTTOM TRIM BRACKET AND SUPPORT

H. Take the Top Trim Bracket Support (047-4136-01) (Item 8), place the top angle under the top angle of the trim bracket, and loosely secure the two pieces with three bolts (089-6425-01) (Item 16), three nuts (089-2344-03) (Item 17), and six washers (089-8227-09) (Item 18) as shown in Figure 7-C.

I. On the bulkhead, drill out two rivets and, using the three existing holes in the support, match drill three .171 diameter holes in the bulkhead and secure with three screws (089-6531-02) (Item 20), three nuts (089-2344-02) (Item 21) and three washers (089-8227-07) (Item 22) as shown in Figure 7-C.

J. Adjust the trim bracket supports so that the trim bracket is perpendicular to the trim tube. Tighten down the mounting bolts that hold the supports to the bracket.

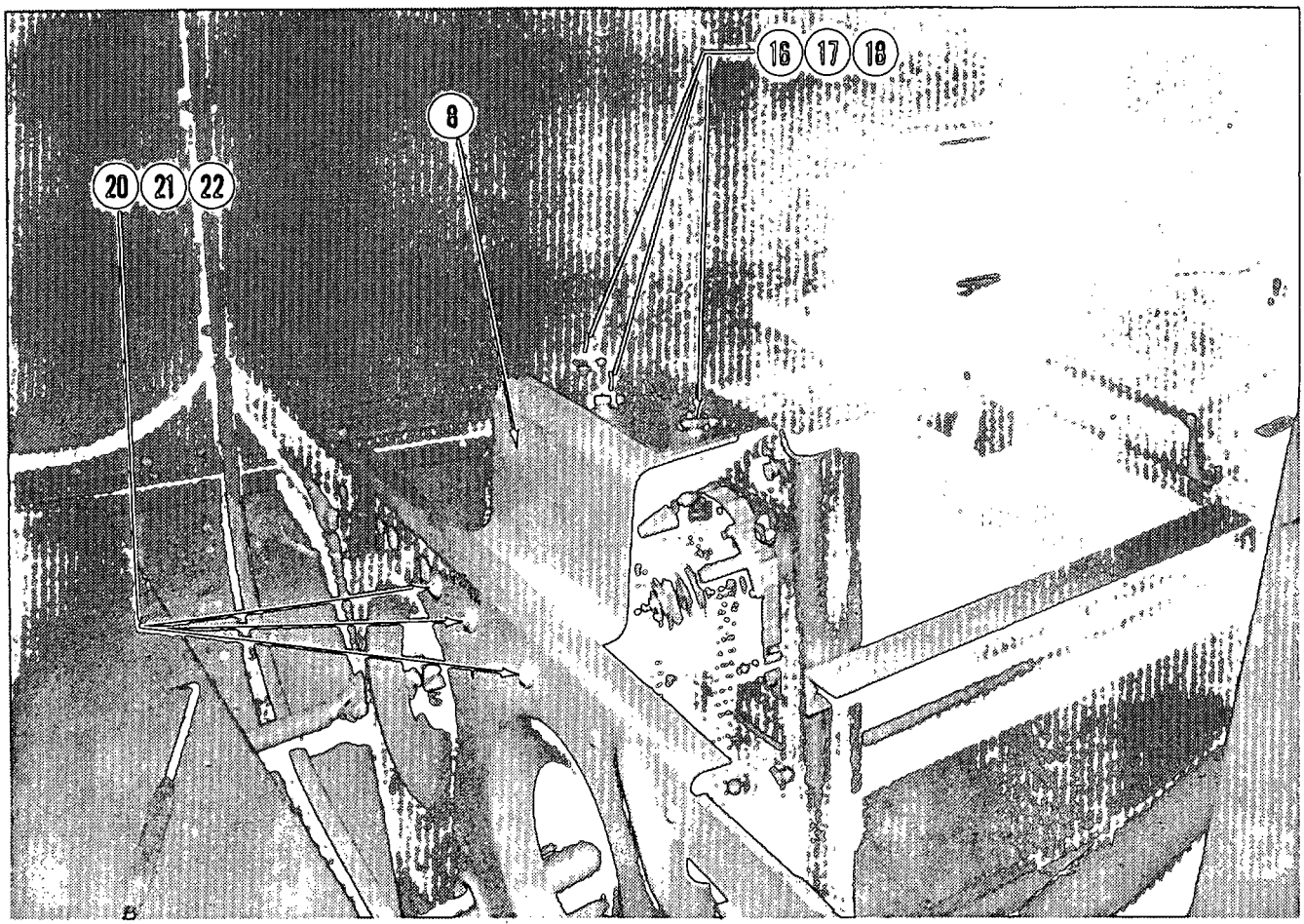


FIGURE 7-C TOP TRIM BRACKET AND SUPPORT

K. Mount the KS 179 to the assembly as shown in Figure 7-D with three bolts (089-6425-00) (Item 27) and three washers (089-8227-09) (Item 5).

L. Mount the Trim Mounting Plate (047-5852-01) (Item 9) to the back side of the Trim Mounting Bracket with four bolts (089-6425-03) (Item 26), four nuts (089-2344-03) (Item 17), and twenty-four washers (089-8227-09) (Item 18). As an additional adjustment to insure proper alignment of the sprocket and spur gear, (see "M") four washers are used as spacers at each bolt. They should be placed between the Trim Mounting Plate and the Trim Mounting Bracket as shown in Figure 7-D. For proper alignment, washers may be moved from between the units to behind the Trim Mounting Plate as required.

M. Take the Trim Drive Chain (090-0418-00) (Item 23) and wrap it around the KS 179 sprocket and spur gear and secure with the master link (090-0295-00) (Item 24). Rotate the gears a full 360° and tighten the chain so that there is only 1/4" play in the chain. This is accomplished by pushing the KS 179 up. If the servo needs to be moved aft for proper alignment, additional washers (089-8227-09) (Item 18) may be used as spacers between the KS 179 and the bracket assembly. Tighten the bolts on the mounting plate. Apply suitable grease to chain and bearing.

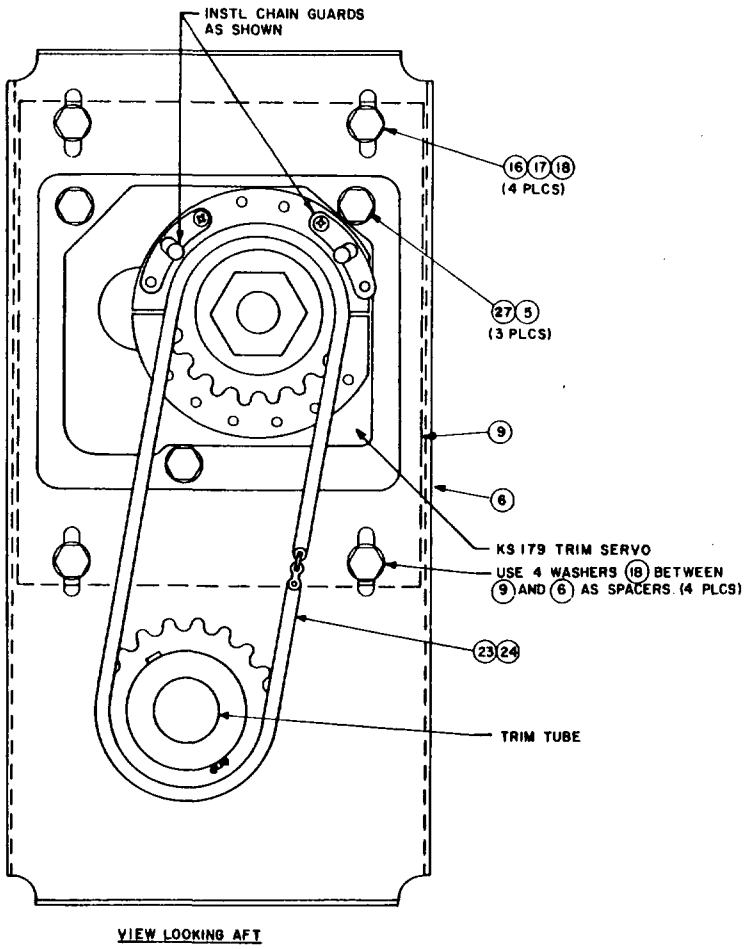


FIGURE 7-D TRIM SERVO, CHAIN AND CHAIN GUARDS

N. Use the connector (030-2000-00) (Item 3), hood (030-1009-00) (Item 2), and Lever and Pivot Assembly (030-1008-00) (Item 1) provided, connect the wiring to the servo as shown in Section 10.

O. Install the Cable Guards on the capstan as shown in Figure 7-D.

8.0 PITCH SERVO INSTALLATION

This section applies to the installation of the KS 177 Unit.

The KS 177 Unit Installation Kit 050-1817-00 consists of the following:

ITEM	PART NUMBER	DESCRIPTION	SPEC	QTY
1	030-1008-00	Lvr/Pvt Ass'y	PMA	2
2	030-1009-00	Hood Conn	PMA	1
3	030-2000-00	Conn 14 Pin FFM	PMA	1
4	089-5393-07	Bolt	PMA	3
5	089-8227-09	Washer	PMA	3

The Pitch Servo Installation Kit 050-1963-00 consists of the following:

ITEM	PART NUMBER	DESCRIPTION	SPEC	QTY
6	047-5851-01	Pitch Mounting Bracket	PMA	1
7	047-4126-01	Riser, Left	PMA	1
8	047-4127-01	Riser, Right	PMA	1
9	047-4133-01	Yaw Support	PMA	1
10	089-6425-01	Bolt	AN3-4A	16
11	089-6425-02	Bolt	AN3-5A	2
12	089-6425-03	Bolt	AN3-6A	2
13	089-2344-03	Nut	AN365-1032	20
14	089-8227-09	Washer	AN960-10	48
15	089-6426-02	Bolt	AN4-5A	1
16	089-2344-04	Nut	AN365-4-28	1
17	089-8227-11	Washer	AN06-416	2
18	071-1258-00	Cable Ass'y	PMA	1
19	047-4508-01	Rod Clamp	PMA	4
20	047-4489-01	Pitch Link	PMA	2
21	090-0217-00	Locking Clips	MS21256-1	2
22	047-5051-01	Pitch Link	PMA	1
23	090-0324-01	Cotter Pin	MS24665-132	2
24	089-7040-02	Bolt	AN3-5	2
25	089-2334-02	Nut	AN320C3	2
26	047-4132-01	Trim Support	PMA	1
27	047-4132-03	Trim Support	PMA	1
28	089-6425-00	Bolt	AN3-3A	3

A. The KS 177 Pitch Servo is to be installed for KAP 150 Systems and KFC 150 Systems. The KS 177 Pitch Servo is not installed in KAP 100 Systems. The KS 177 Pitch Servo is located aft of Sta. 125.0 and aft of the trim servo. Adjust the slip clutch of the capstan to the value shown in Section 5.0 (Page 5-1). See Figure 5-B for adjustment of the clutch.

B. Take the Pitch Mounting Bracket (047-5851-01) (Item 6) and temporarily clamp to it the left Riser (047-4126-01) (Item 7) and right Riser (047-4127-01) (Item 8). The Risers are attached to the bottom side of the bracket.

C. Install the KS 177 Pitch Servo in the servo mounting cutout and secure with three bolts (089-6425-00) (Item 28) and three washers (089-8227-09) (Item 5).

D. Place the assembly in the airplane with the risers resting on the stringers on the side of the airplane. The forward edge of the mounting bracket is approximately 12.5" aft of the forward edge of the crossmembor attached to bulkhead Sta. 125.3. (See Figure 8-A.)

NOTE

RUN THE CONTROL TUBES FROM STOP TO STOP TO VERIFY THAT THEY DO NOT INTERFERE WITH THE CAPSTAN OR BRACKET ASSEMBLY.

E. Drill out two existing rivets on each stringer and drill one new hole on each stringer using a .218 dia. drill through both risers and stringers and secure with a total of six bolts (089-6425-01) (Item 10), six nuts (089-2344-03) (Item 13) and twelve washers (089-8227-09) (Item 14) as shown in Figure 8-B.

F. Match drill two .218 diameter holes through both sides of the mounting bracket and risers and secure with a total of four bolts (089-6425-01) (Item 10), four nuts (089-2344-03) (Item 13) and eight washers (089-8227-09) (Item 14) as shown in Figure 8-B.

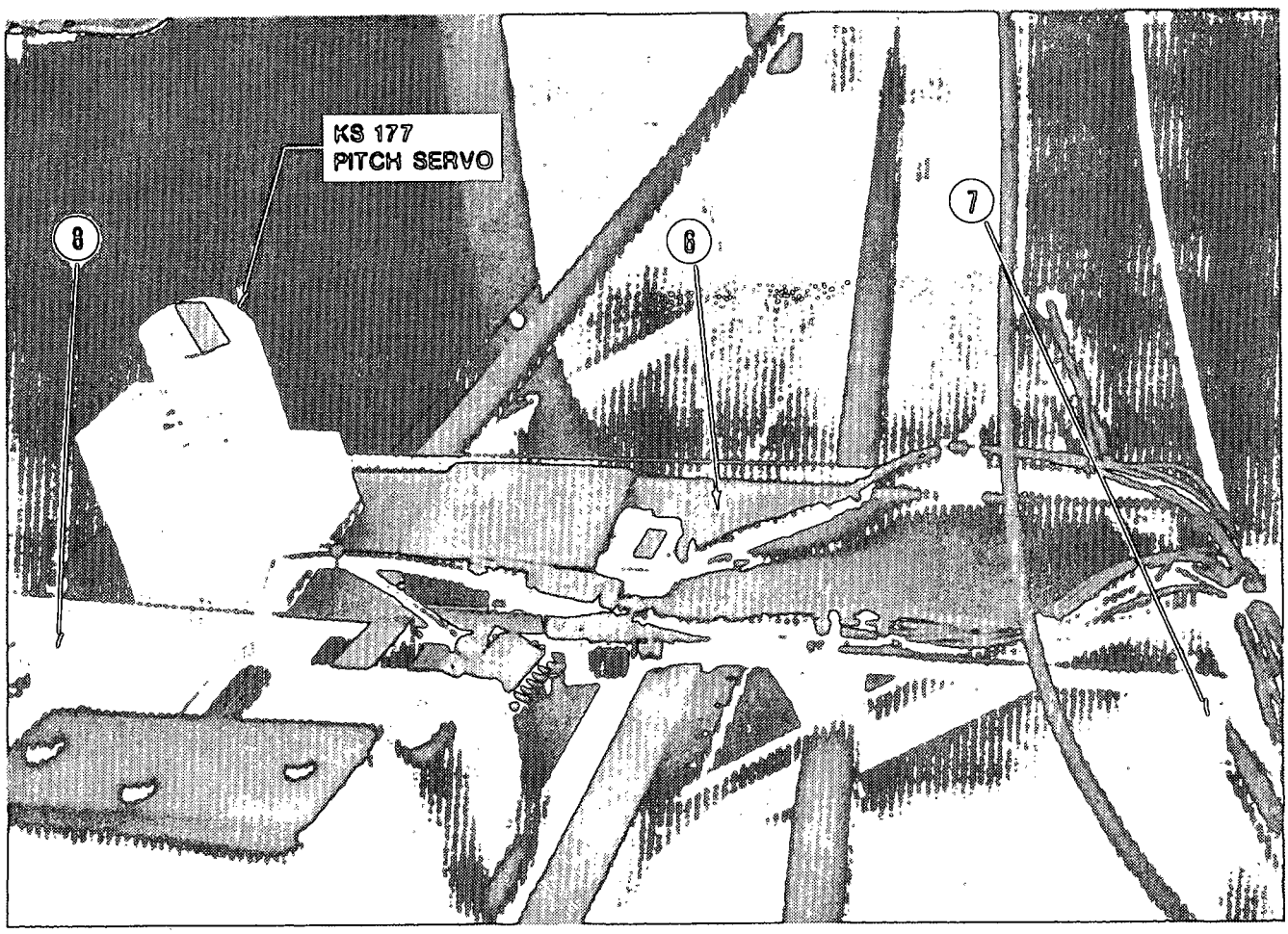


FIGURE 8-A PITCH SERVO AND MOUNTING BRACKET

G. Note the position of the angle brace assembly (Mooney P/N 830040-1) as shown in Figure 8-C.

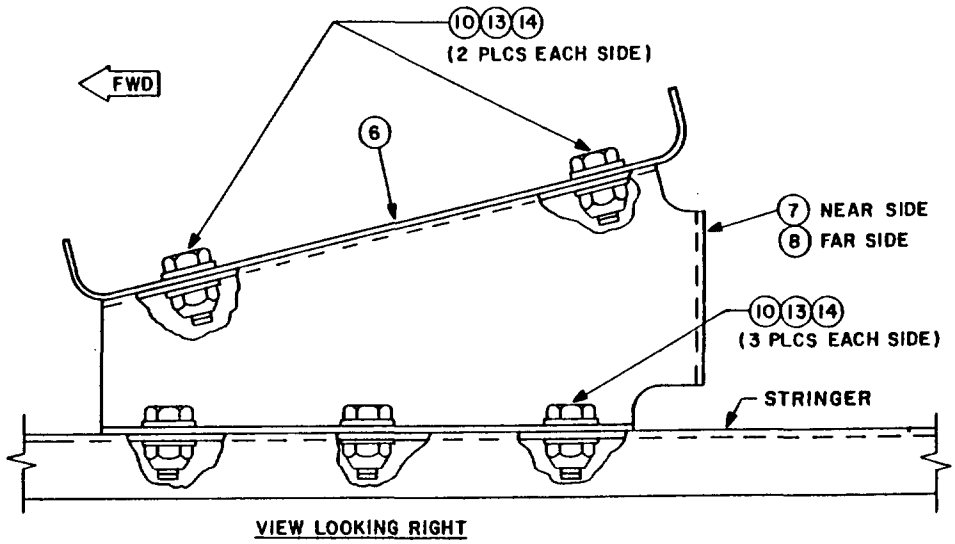


FIGURE 8-B PITCH RISERS

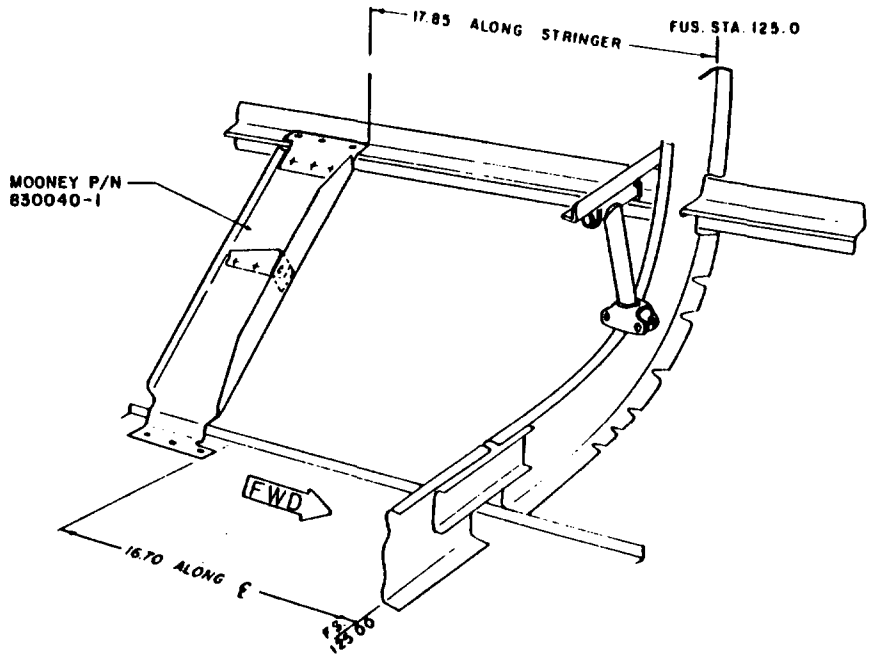


FIGURE 8-C ANGLE BRACE ASSEMBLY

H. Take the Support (047-4133-01) (Item 9) and place it under the left side (facing forward) of the mounting bracket, inboard of the rudder control tube. Attach the slotted flange of the support to the airplane angled brace using the existing hole in the brace. Secure with one bolt (089-6426-02) (Item 15), one nut (089-2344-04) (Item 16) and two washers (089-8227-11) (Item 17) as shown in Figure 8-D.

I. With the top flange of the support directly beneath the pre-drilled holes in the pitch bracket, match drill two .218 diameter holes and secure with two bolts (089-6425-01) (Item 10), two nuts (089-2344-03) (Item 13) and four washers (089-8227-09) (Item 14).

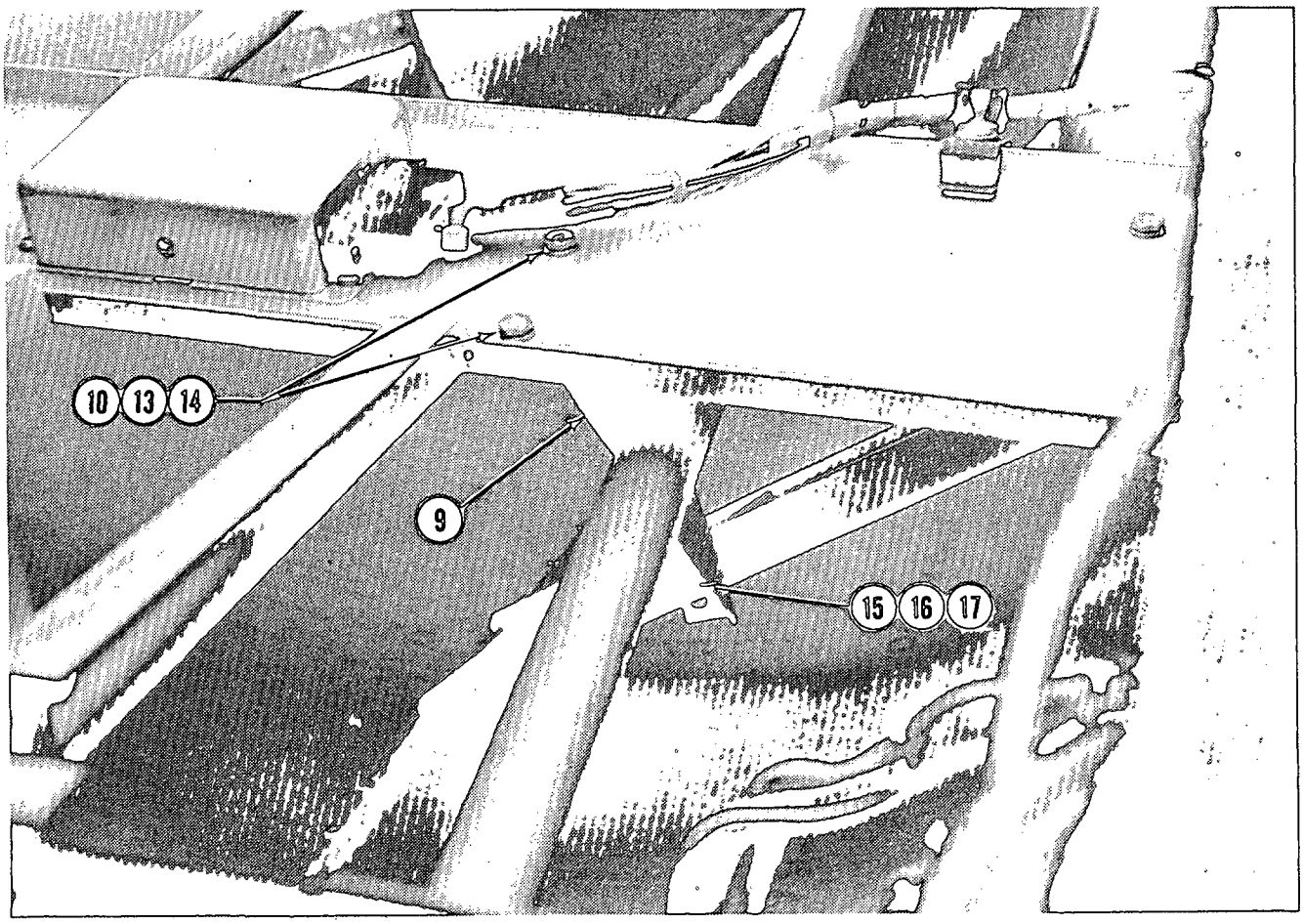


FIGURE 8-D PITCH SUPPORT

J. Attach the slotted ends of the two Trim Supports (047-4132-01) (Item 26) and (047-4132-03) (Item 27) to the trim bracket flanges with two bolts (089-6425-01) (Item 10), four washers (089-8227-09) (Item 14), and two nuts (089-2344-03) (Item 13). Butt the aft ends of the supports against the forward flange of the pitch bracket and match drill one .191 dia. hole through each support and the bracket flange. Secure with two bolts (089-6425-01) (Item 10), four washers (089-8227-09) (Item 14), and two nuts (089-2344-03) (Item 13). (See Figure 8-E.) (Item 27 instal. is mirror image of Item 26.)

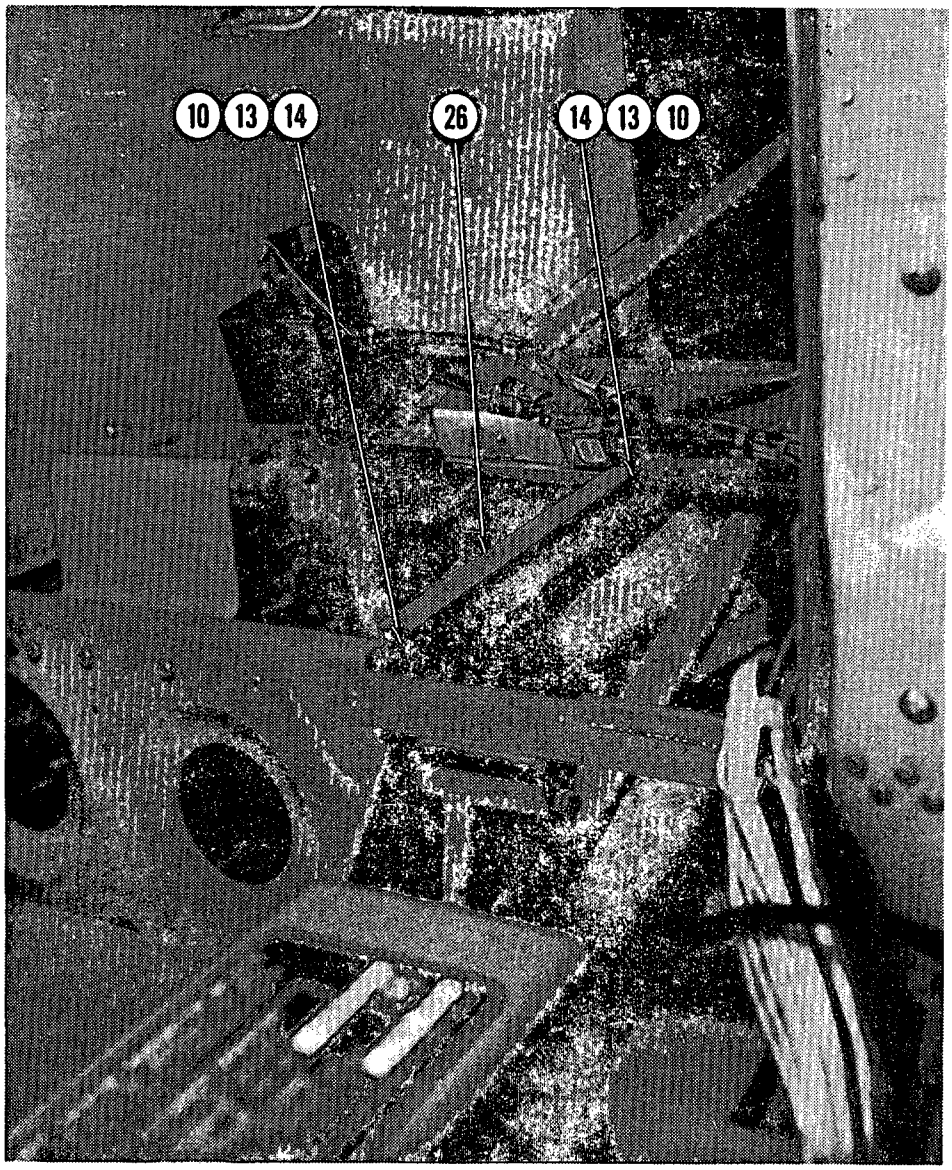


FIGURE 8-E TRIM SUPPORTS

K. Set the elevator controls in the neutral position. Take the Pitch Cable Assembly (071-1258-00) (Item 18) and insert the positioning ball into the capstan so that it faces directly inboard. Wrap the cable around the capstan as shown in Figure 8-F with the turnbuckle end routed aft.

L. Reinstall the cable guard over the capstan as shown in Figure 8-F. Safety wire the guard posts to the attaching screws as shown.

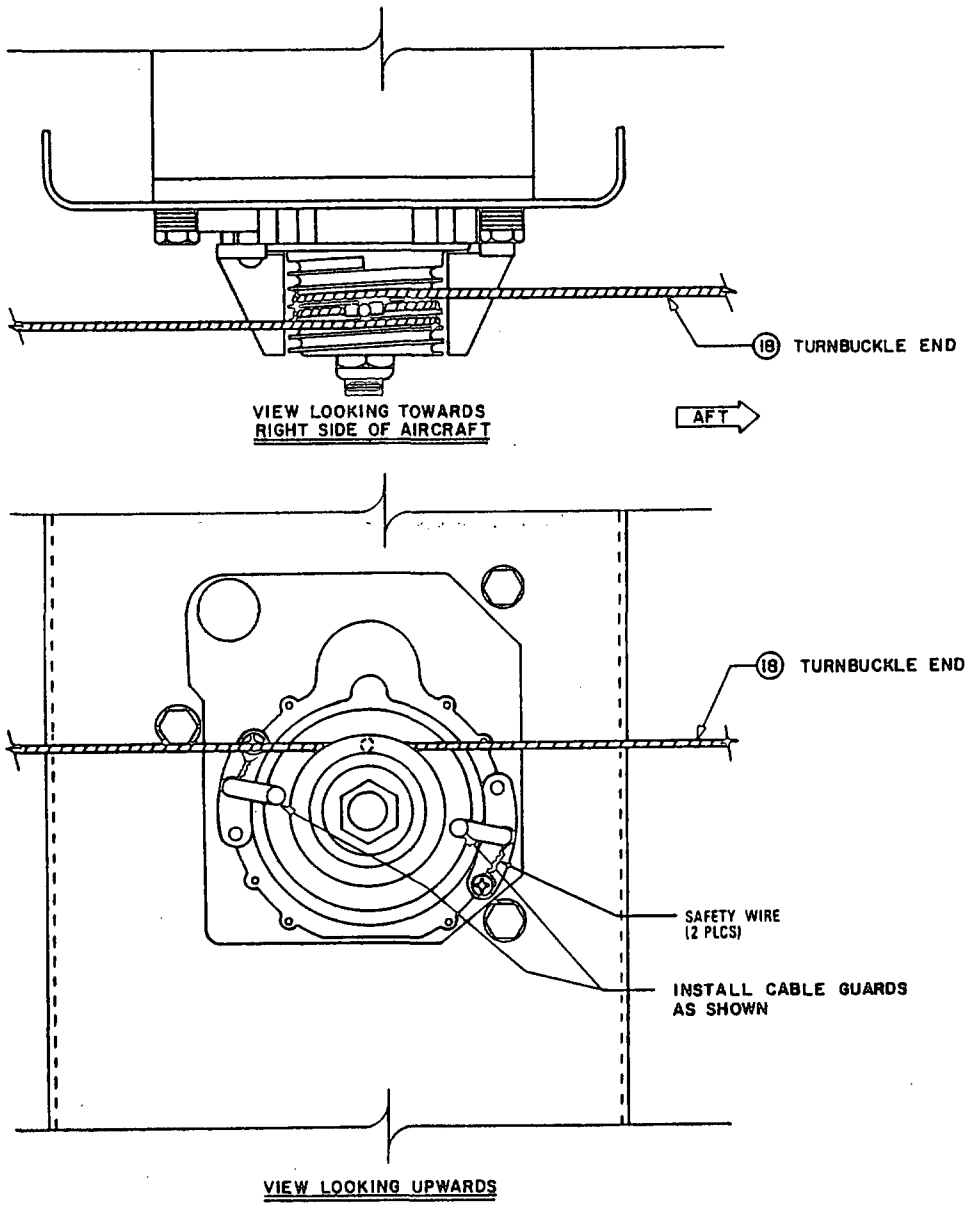


FIGURE 8-F PITCH CABLE AND GUARDS

M. Attach the Pitch Bridle Cable at the forward end of the elevator push rod in the following manner. Take two Rod Clamps (047-4508-01) (Item 19) and place them on the forward end of the elevator push rod and secure each inboard flange using one bolt (089-6425-02) (Item 11), two washers (089-8227-09) (Item 14), and one nut (089-2344-03) (Item 13). One washer may be placed between the two Rod Clamp attach points to prevent rod clamp flange distortion. Take one Pitch Link (047-4489-01) (Item 20) and attach to the top surface of the outboard rod clamp flange using one bolt (089-6425-03) (Item 12), two washers (089-8227-09) (Item 14), and one nut (089-2344-03) (Item 13). Attach the Pitch Bridle Cable (071-1258-00) (Item 18) on the bottom surface of the pitch link using one bolt (089-7040-02) (Item 24), two washers (089-8227-09) (Item 14), one nut (089-2334-02) (Item 25), and one cotter pin (090-0324-01) (Item 23). (See Figure 8-G.)

N. For M20K models only, detach the tensioning spring from the aft end of the push rod. For both M20J and M20K, attach two Rod Clamps (047-4508-01) (Item 19) to the aft end of the elevator push rod, using one bolt (089-6425-02) (Item 11), two washers (089-8227-09) (Item 14), and one nut 089-2344-03) (Item 13) on the inboard flange of the rod clamps. One washer may be placed between the two rod clamp attach points to prevent rod clamp flange distortion. Take Pitch Link (047-4489-01) (Item 20) for M20J or (047-5051-01) (Item 22) for M20K, and attach to the bottom surface of the outboard rod clamp flange (with the countersunk hole of the link aft) using one bolt (089-6425-03) (Item 12), two washers (089-8227-09) (Item 14) and one nut (089-2344-03) (Item 13) through the middle hole of the pitch link. Attach the Pitch Bridle Cable as described in paragraph M. For M20K models only, attach the tensioning spring through the countersunk hole in the pitch link. (See Figure 8-G.)

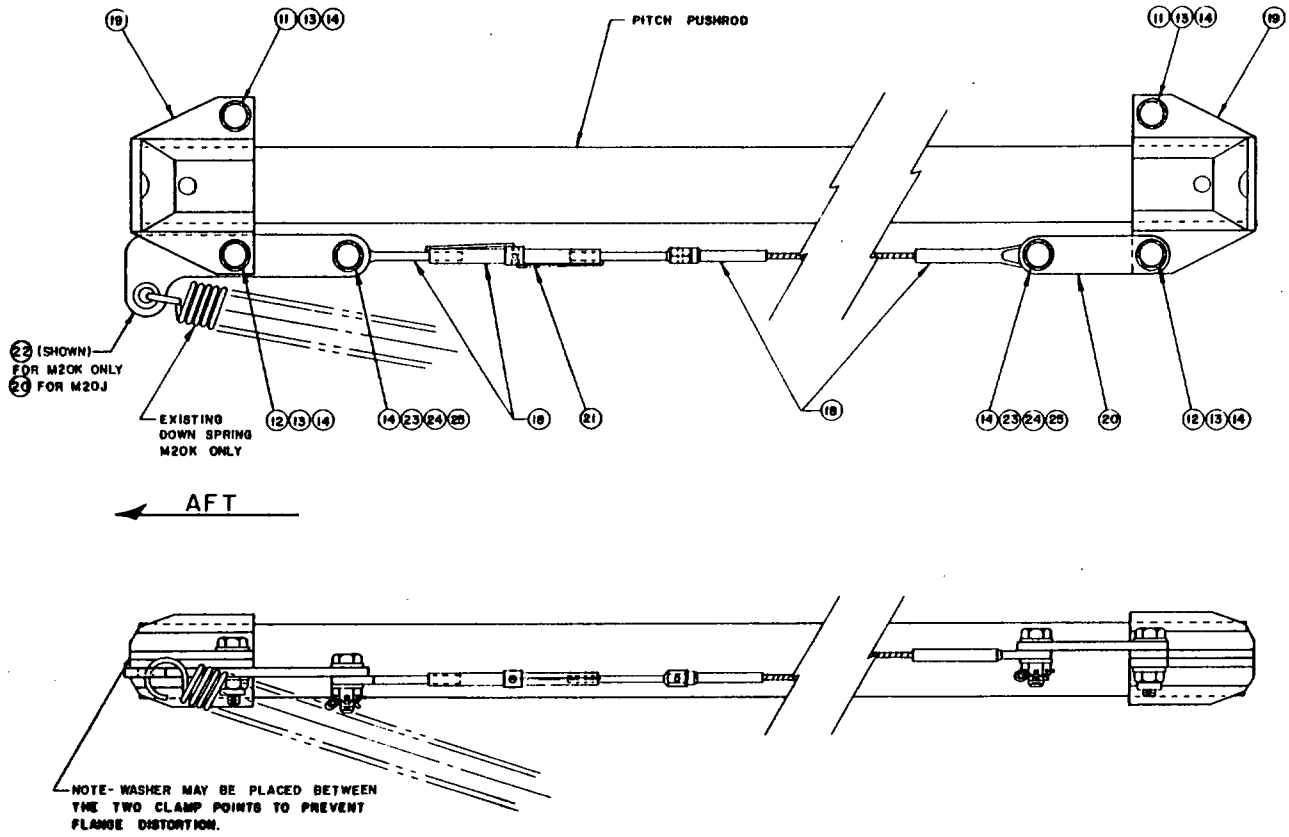


FIGURE 8-G PITCH CABLE ATTACHMENTS

O. Tighten the bridle cable, using the turnbuckle, to a tension of 30 ±3 lbs. and install two Locking Clips (090-0217-00) (Item 21) in the turnbuckle.

P. Run the elevators through the full length of travel while observing the servo mount to verify that all cables are aligned and operating freely.

Q. Using the Connector (030-2000-00) (Item 3), Hood (030-1009-00) (Item 2), Lever and Pivot Ass'y (030-1008-00) (Item 1) provided, connect the wiring per Section 10.

9.0 DOCUMENTATION INSTALLATION

Upon completion of the installation, insert the appropriate Flight Manual Supplement, 006-0396-XX (M20J & M20K), into the airplane's operator handbook.

Documentation Kit 050-1965-00 contains the following items:

KING PART NO.	DESCRIPTION	QTY
006-0249-00	Installation Manual	1
006-0396-00	KAP 100 Flight Manual Supplement (M20J & M20K)	1
006-0396-01	KAP 150/KFC 150 Flight Manual Supplement (M20J & M20K)	1

9.1 When the optional KAS 297B Vertical Speed and Altitude Selector is installed, also insert the following Flight Manual Supplement (contained in System 150AZALT-XX) into the airplane operator handbook:

KING PART NO.	DESCRIPTION	QTY
006-0396-02	KAP 150/KFC 150 with KAS 297B Flight Manual Supplement	1

9.2 The following entry is to be made in the airplane logbook upon completion of the installation:

SEE FAA FORM 337, DATED_____ FOR DETAILS OF THE BENDIX/KING FLIGHT CONTROL SYSTEM INSTALLED IN ACCORDANCE WITH STC SA1561CE-D.

10.0 ELECTRICAL INTERCONNECT DIAGRAMS AND POWER DISTRIBUTION

10.1 ELECTRICAL INTERCONNECT DIAGRAMS

The following diagrams show the electrical wiring necessary for proper installation of the various systems.

For 14 Volt KAP 100 Systems (with or without electric pitch trim control) refer to Figure 10-A.

For 14 Volt KAP 150 or KFC 150 Systems refer to Figure 10-B.

If a 14 Volt KCS 55A Slaved Compass System is installed, Figure 10-C has been provided for wiring instructions.

For the 14 Volt KAS 297B Vertical Speed and Altitude Selector option refer to Figure 10-D.

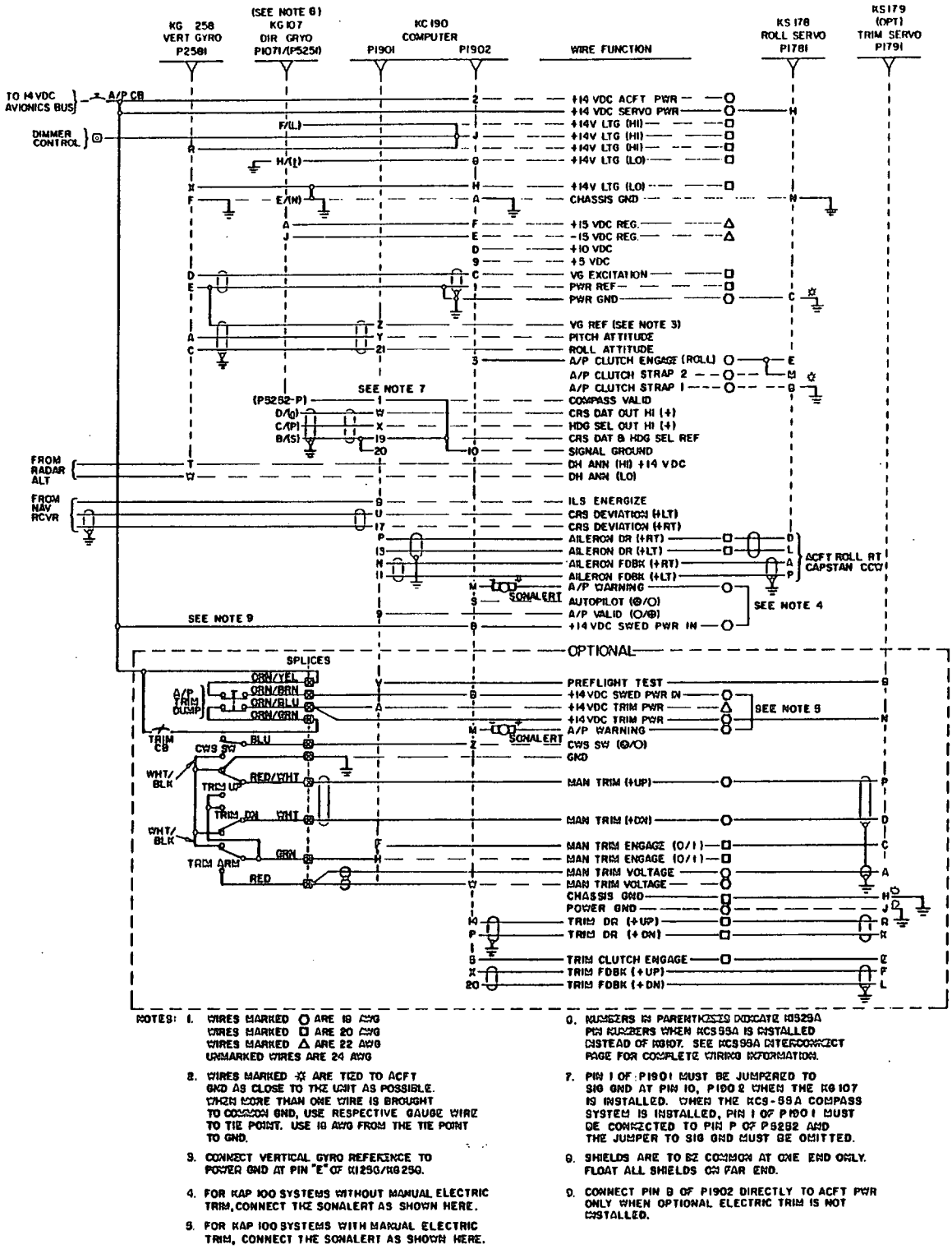
For 28 Volt KAP 100 System (with or without electric pitch trim control) refer to Figure 10-E.

For 28 Volt KAP 150 or KFC 150 Systems refer to Figure 10-F.

If a 28 Volt KCS 55A Slaved Compass System is installed, Figure 10-G has been provided for wiring instructions.

For the 28 Volt KAS 297B Vertical Speed and Altitude Selector option refer to Figure 10-H.

For the 14 or 28 Volt Nav Switching option refer to Figure 10-I.



NOTES:

1. WIRES MARKED ○ ARE 18 AWG
   WIRES MARKED □ ARE 20 AWG
   WIRES MARKED △ ARE 22 AWG
   UNMARKED WIRES ARE 24 AWG
2. WIRES MARKED ✲ ARE TIED TO ACFT GND AS CLOSE TO THE UNIT AS POSSIBLE. WHEN MORE THAN ONE WIRE IS BROUGHT TO COMMON GND, USE RESPECTIVE GAUGE WIRE TO TIE POINT. USE 18 AWG FROM THE TIE POINT TO GND.
3. CONNECT VERTICAL GYRO REFERENCE TO POWER GND AT PIN "E" OF W1250/W9250.
4. FOR KAP 100 SYSTEMS WITHOUT MANUAL ELECTRIC TRIM, CONNECT THE SONALERT AS SHOWN HERE.
5. FOR KAP 100 SYSTEMS WITH MANUAL ELECTRIC TRIM, CONNECT THE SONALERT AS SHOWN HERE.
6. NUMBERS IN PARENTHESIS INDICATE W529A PIN NUMBERS WHEN KCS55A IS INSTALLED INSTEAD OF W801. SEE KCS99A INTERCONNECT PAGE FOR COMPLETE WIRING INFORMATION.
7. PIN 1 OF P1901 MUST BE JUMPERED TO SIG GND AT PIN 10, P1902 WHEN THE KG 107 IS INSTALLED. WHEN THE KCS-88A COMPASS SYSTEM IS INSTALLED, PIN 1 OF P1901 MUST BE CONNECTED TO PIN P OF P5282 AND THE JUMPER TO SIG GND MUST BE OMITTED.
8. SHIELDS ARE TO BE COMMON AT ONE END ONLY. FLOAT ALL SHIELDS ON FAR END.
9. CONNECT PIN B OF P1902 DIRECTLY TO ACFT PWR ONLY WHEN OPTIONAL ELECTRIC TRIM IS NOT INSTALLED.

FIGURE 10-A KAP 100 ELECTRICAL INTERCONNECT (14V)
(155-9197-00, Sheet 1 of 12)

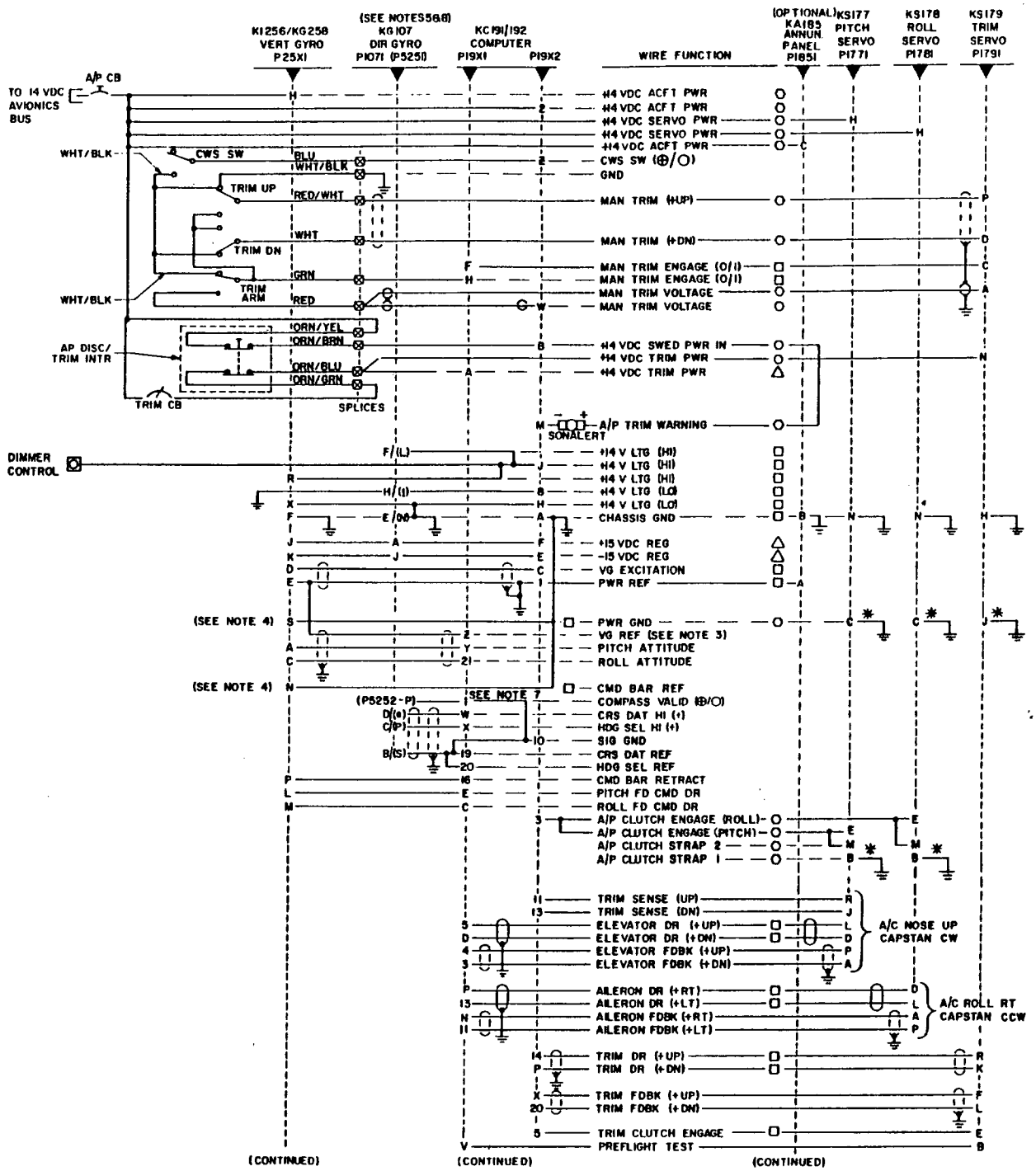
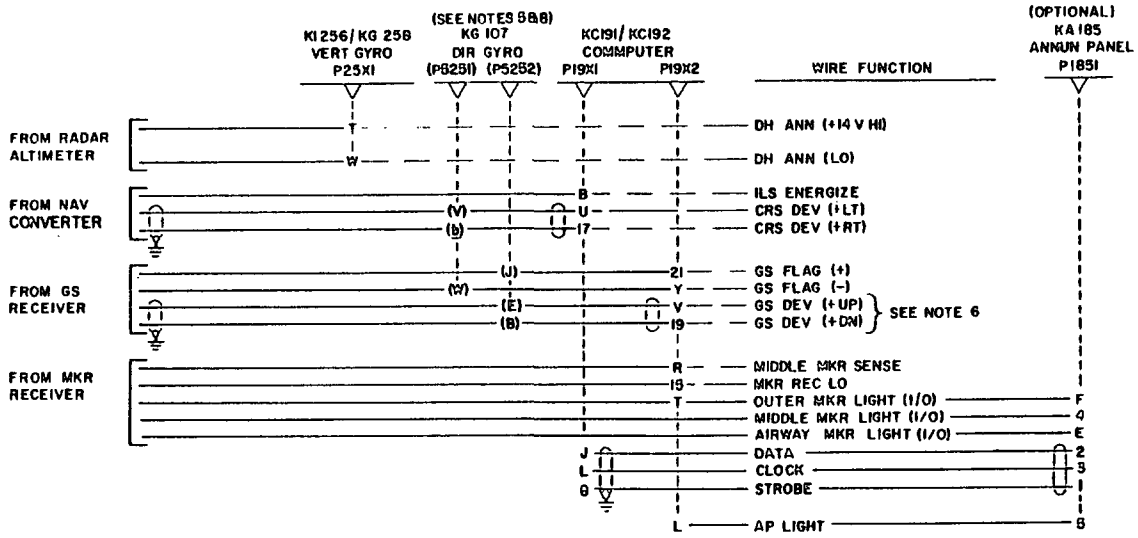


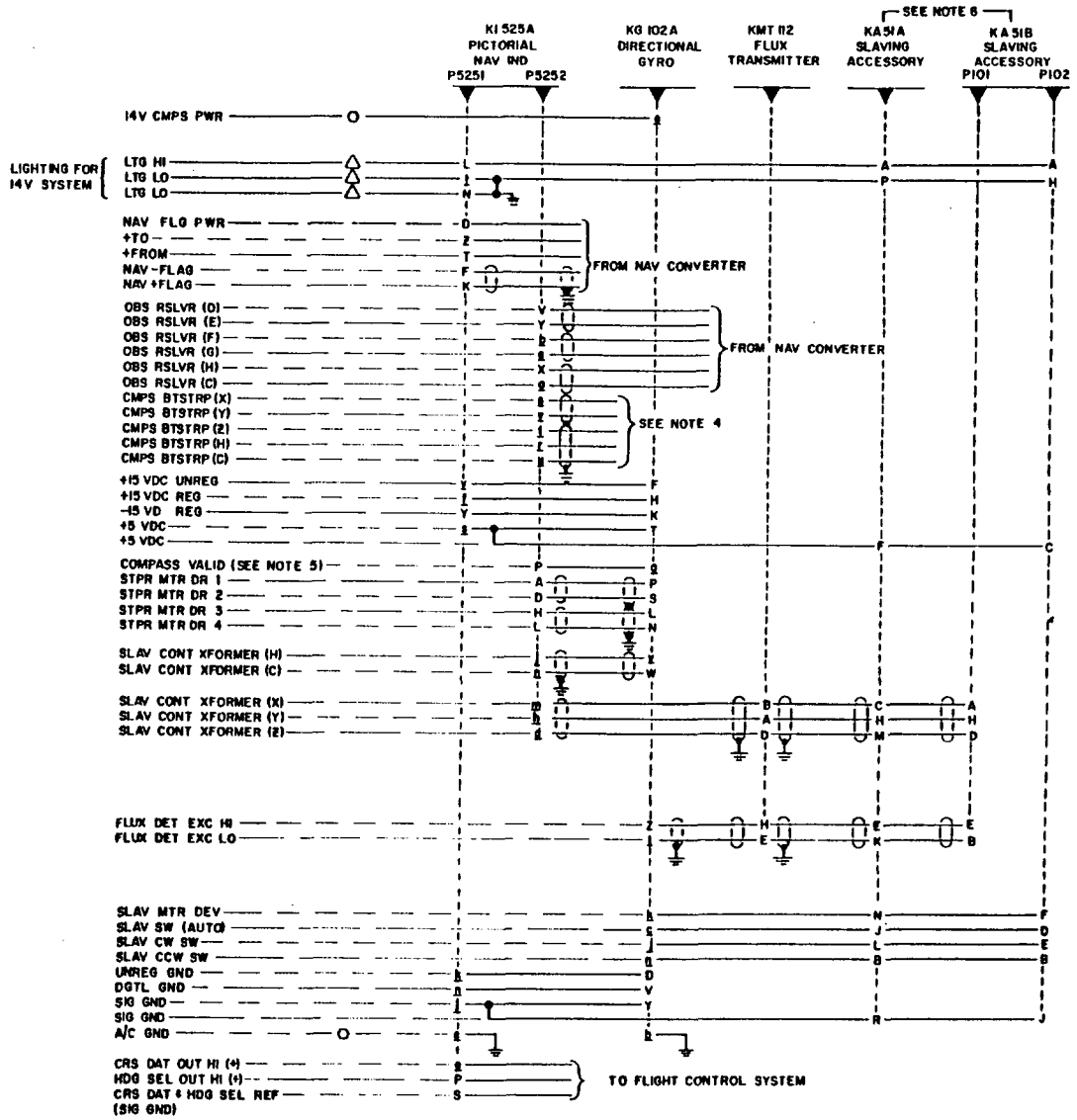
FIGURE 10-B KAP 150/KFC 150 ELECTRICAL INTERCONNECT (14V)
(155-9197-00, Sheet 2 of 12)



NOTES:

1. WIRES MARKED ○ ARE 18 AWG
   WIRES MARKED □ ARE 20 AWG
   WIRES MARKED △ ARE 22 AWG
   UNMARKED WIRES ARE 24 AWG
2. WIRES MARKED ☼ ARE TIED TO A/C GND AS CLOSE TO THE UNIT AS POSSIBLE. WHEN MORE THAN ONE WIRE IS BROUGHT TO COMMON GND, USE SPECIFIED GAUGE WIRE TO TIE POINT. USE 18 AWG FROM THE TIE POINT TO GND.
3. CONNECT VERTICAL GYRO REFERENCE TO POWER GROUND AT PIN E OF KI256/KG256.
4. PINS N & S OF KI 256 MUST BE RETURNED TO P-1922-A, AND MUST NOT BE JUMPERED TO PIN F OF KI 256. WHEN KG 258 IS USED, PINS N & S ARE NOT USED.
5. NUMBERS IN PARENTHESES INDICATE KI 525A PIN NUMBERS WHEN KCS 55A COMPASS SYSTEM IS INSTALLED INSTEAD OF KG 107. SEE KCS 55A INTERCONNECT PAGE FOR COMPLETE WIRING INFORMATION.
6. SHIELDS ARE TO BE COMMON AT ONE END ONLY. FLOAT ALL SHIELDS ON FAR END.
7. PIN 1 OF P19=1 MUST BE JUMPERED TO SIG GND AT PIN 10, P19=2 WHEN THE KG107 IS INSTALLED. WHEN THE KCS-55A COMPASS SYSTEM IS INSTALLED, PIN 1 OF P19=1 MUST BE CONNECTED TO PIN P OF P5252 AND THE JUMPER TO SIG GND MUST BE OMITTED.
8. THE KG 107 IS NOT APPROVED FOR USE WITH KFC 150.

FIGURE 10-B KAP 150/KFC 150 ELECTRICAL INTERCONNECT (14V)
(155-9197-00, Sheet 3 of 12)



NOTES:
1. WIRES MARKED ○ ARE #18 AWG
   WIRES MARKED □ ARE #20 AWG
   WIRES MARKED △ ARE #22 AWG
   UNMARKED WIRES ARE #24 AWG
2. FOR COMP SYSTEM OPTIONS AND MECHANICAL INSTALLATION PROCEDURES, REFER TO THE KCS55A INSTALLATION MANUAL.
3. UNLESS OTHERWISE NOTED, ALL GROUNDS ARE TO BE TIED TO AIRCRAFT GROUND AS CLOSE TO EACH UNIT AS POSSIBLE.
4. THE COMPASS BOOTSTRAP OUTPUT IS PROVIDED ON THE KI 525A, 006-3046-01 INDICATOR ONLY.
5. ADDITIONAL CONNECTIONS FOR KI 525A CAN BE FOUND ON THE KAP 100/KAP 150/KFC 150 INTERCONNECT.
6. BOTH THE KA51A AND KA51B SLAVING ACCESSORIES ARE SHOWN. ONLY ONE IS REQUIRED. IGNORE ANY WIRE CONNECTIONS OR SHIELDS AT THE UNIT THAT IS NOT BEING USED.

FIGURE 10-C KCS 55A ELECTRICAL INTERCONNECT (14V)
(155-9197-00, Sheet 4 of 12)

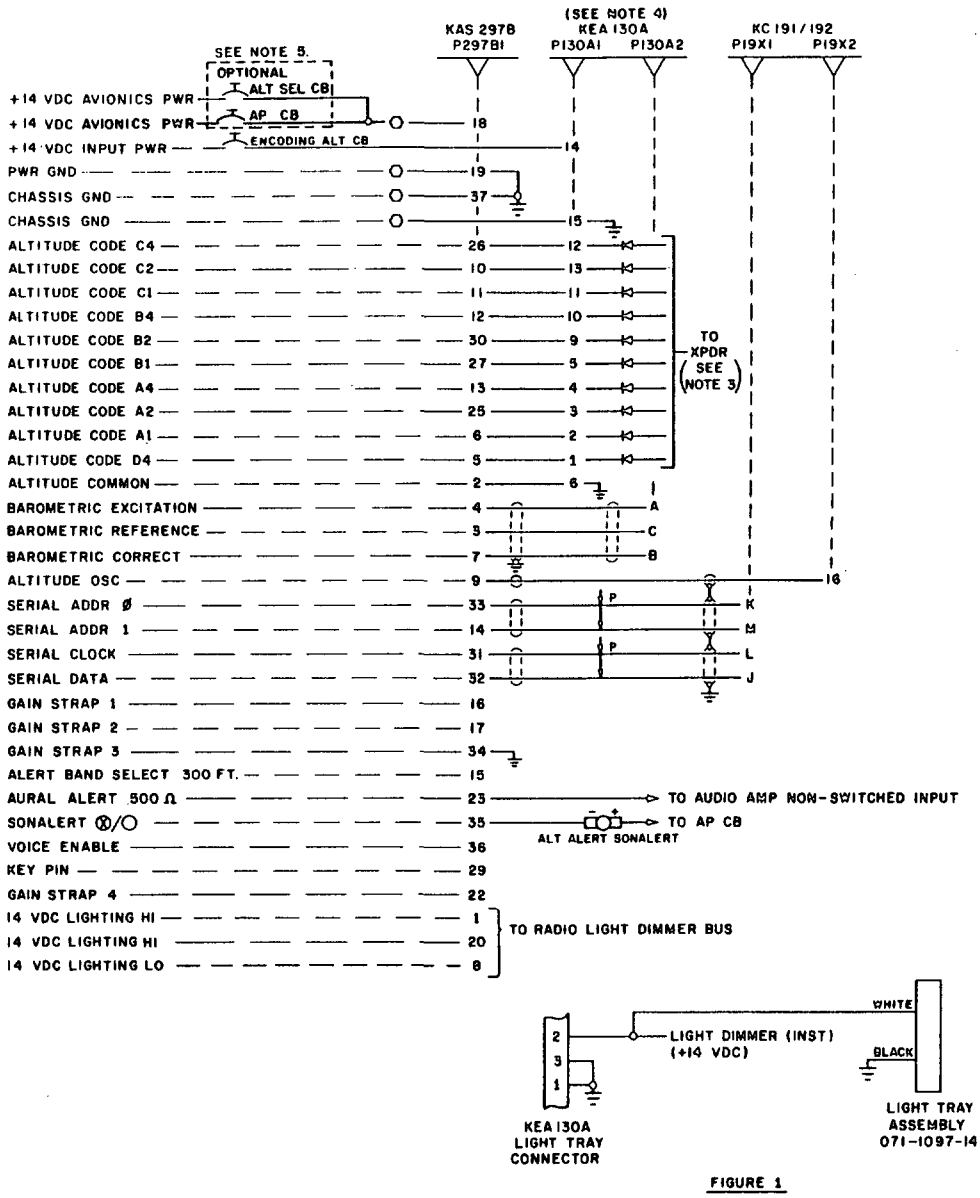
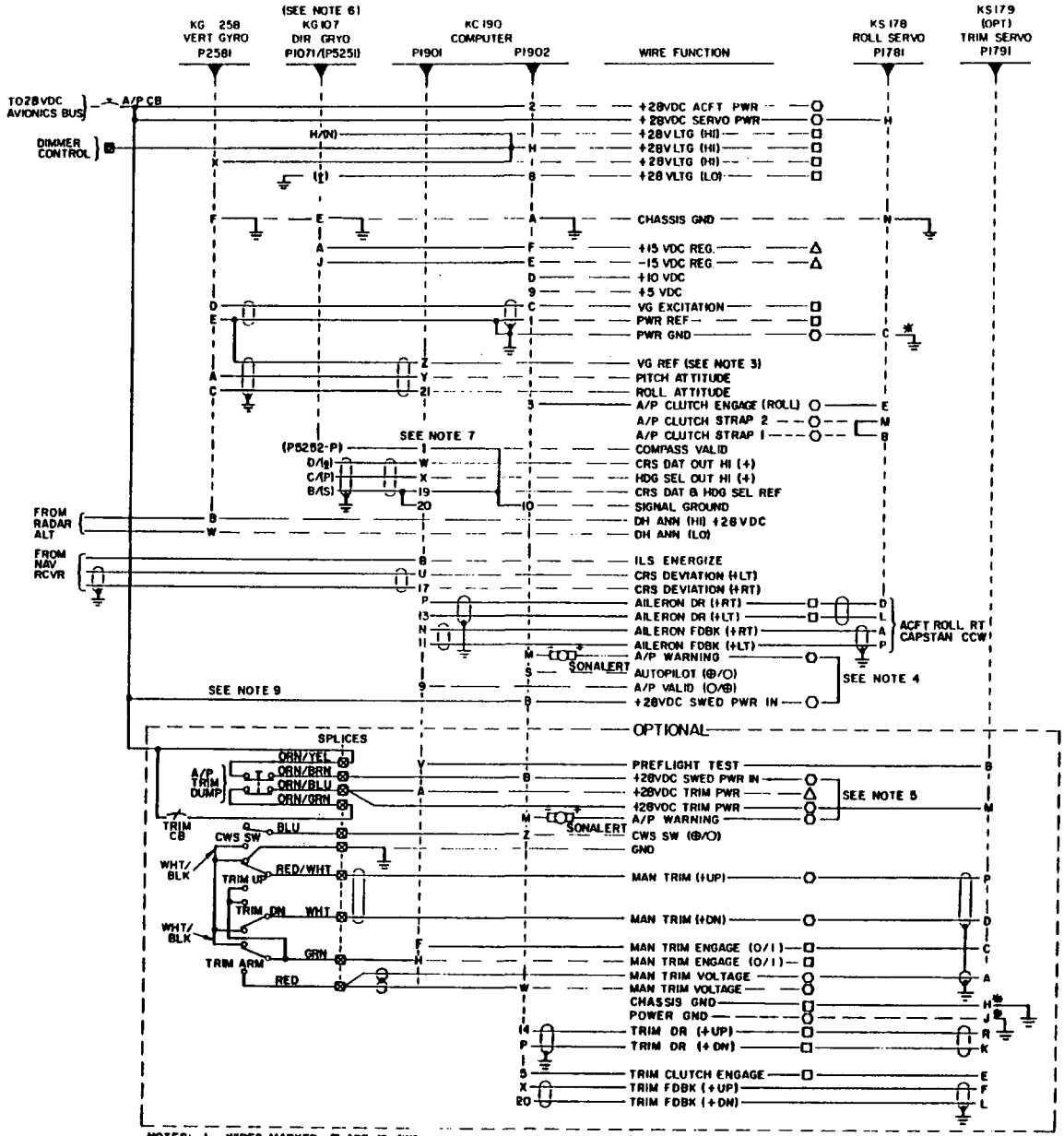


FIGURE 1

NOTES:

1. UNLESS OTHERWISE NOTED ALL WIRES ARE 24 AWG.
2. WIRES MARKED ○ ARE 18 AWG.
3. DIODE ISOLATION AT THE TRANSPONDER IS REQUIRED FOR CORRECT SYSTEM OPERATION. IF THE TRANSPONDER USED DOES NOT HAVE INTERNAL ISOLATION DIODES, INSTALL AN IN4003 OR EQUIVALENT DIODE ON EACH CODE LINE INTO THE UNIT.
4. CONNECTOR WIRING FOR THE KEA 130A REQUIRED LIGHT TRAY ASSEMBLY IS SHOWN IN FIGURE 1.
5. THE KAS 297B MAY BE POWERED BY THE AP BUS OR THRU A SEPARATE 1A ALT SEL CB.

FIGURE 10-D OPTIONAL KAS 297B ELECTRICAL INTERCONNECT (14V)
(155-9197-00, Sheet 5 of 12)



NOTES:

1. WIRES MARKED ○ ARE 18 AWG
   WIRES MARKED □ ARE 20 AWG
   WIRES MARKED △ ARE 22 AWG
   UNMARKED WIRES ARE 24 AWG
2. WIRES MARKED ✱ ARE TIED TO ACFT GND AS CLOSE TO THE UNIT AS POSSIBLE. WHEN MORE THAN ONE WIRE IS BROUGHT TO COMMON GND, USE RESPECTIVE GAUGE WIRE TO TIE POINT. USE 18 AWG FROM THE TIE POINT TO GND.
3. CONNECT VERTICAL GYRO REFERENCE TO POWER GND AT PIN "E" OF K1256/KG258.
4. FOR KAP 100 SYSTEMS WITHOUT MANUAL ELECTRIC TRIM, CONNECT THE SONALERT AS SHOWN HERE.
5. FOR KAP 100 SYSTEMS WITH MANUAL ELECTRIC TRIM, CONNECT THE SONALERT AS SHOWN HERE.
6. NUMBERS IN PARENTHESES INDICATE KI525A PIN NUMBERS WHEN KCS55A IS INSTALLED INSTEAD OF KG107. SEE KCS55A INTERCONNECT PAGE FOR COMPLETE WIRING INFORMATION.
7. PIN 1 OF P1901 MUST BE JUMPERED TO SIG GND AT PIN 10, P1902 WHEN THE KG107 IS INSTALLED. WHEN THE KCS-55A COMPASS SYSTEM IS INSTALLED, PIN 1 OF P1901 MUST BE CONNECTED TO PIN P OF P5252 AND THE JUMPER TO SIG GND MUST BE OMITTED.
8. SHIELDS ARE TO BE COMMON AT ONE END ONLY. FLOAT ALL SHIELDS ON FAR END.
9. CONNECT PIN B OF P1902 DIRECTLY TO ACFT PWR ONLY WHEN OPTIONAL ELECTRIC TRIM IS NOT INSTALLED.

FIGURE 10-E KAP 100 ELECTRICAL INTERCONNECT (28V)
(155-9197-00, Sheet 6 of 12)

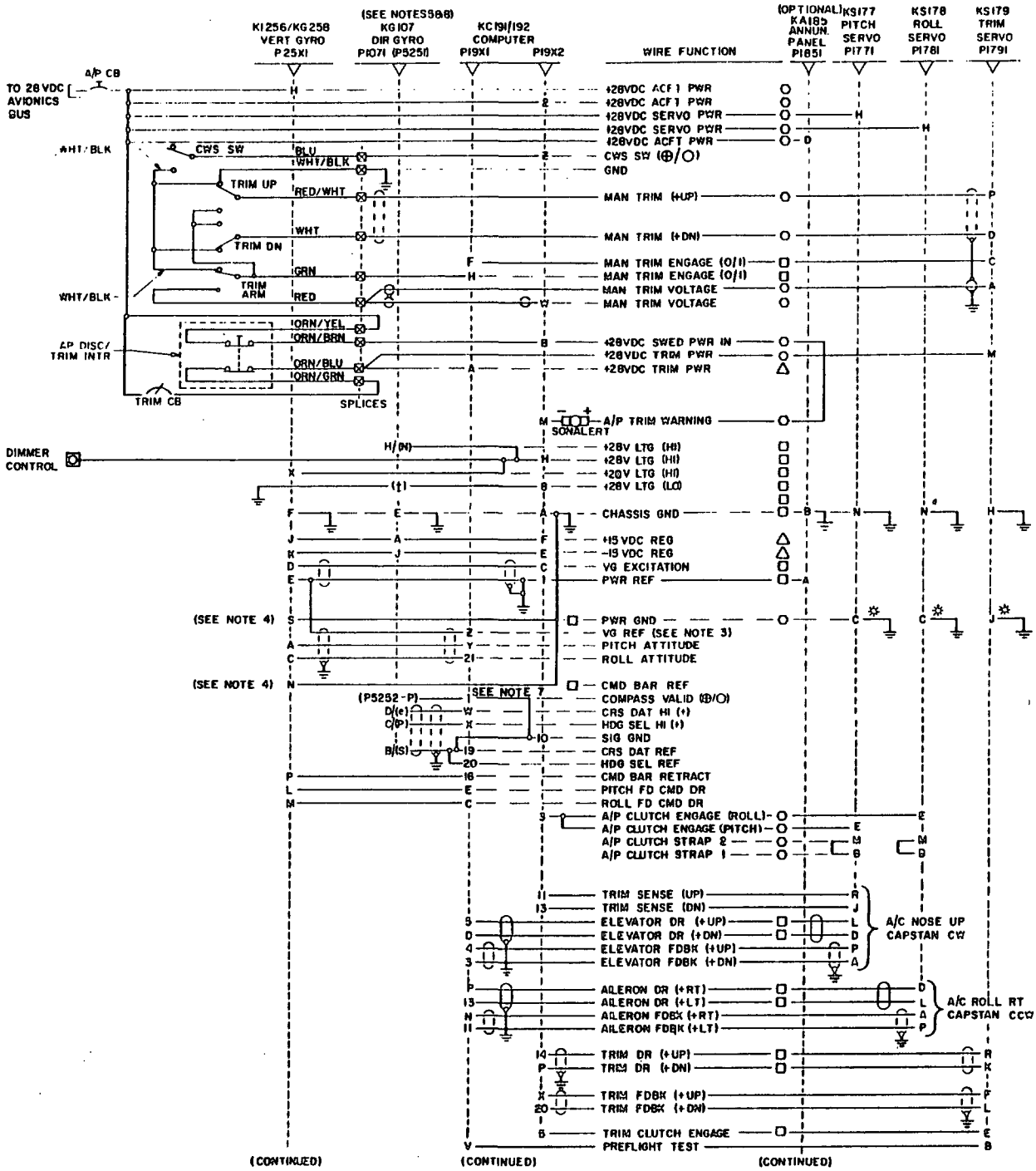
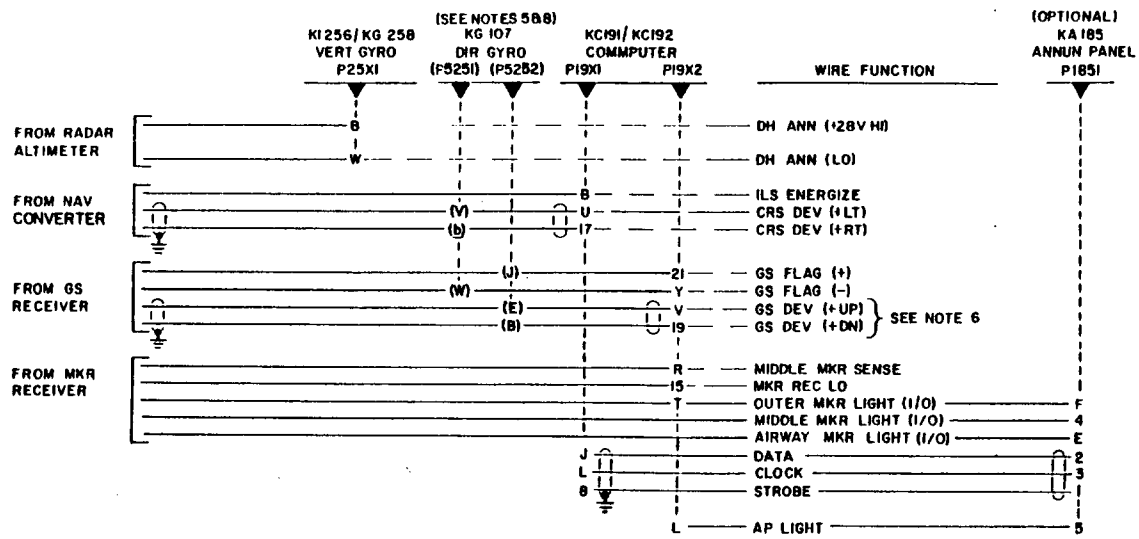


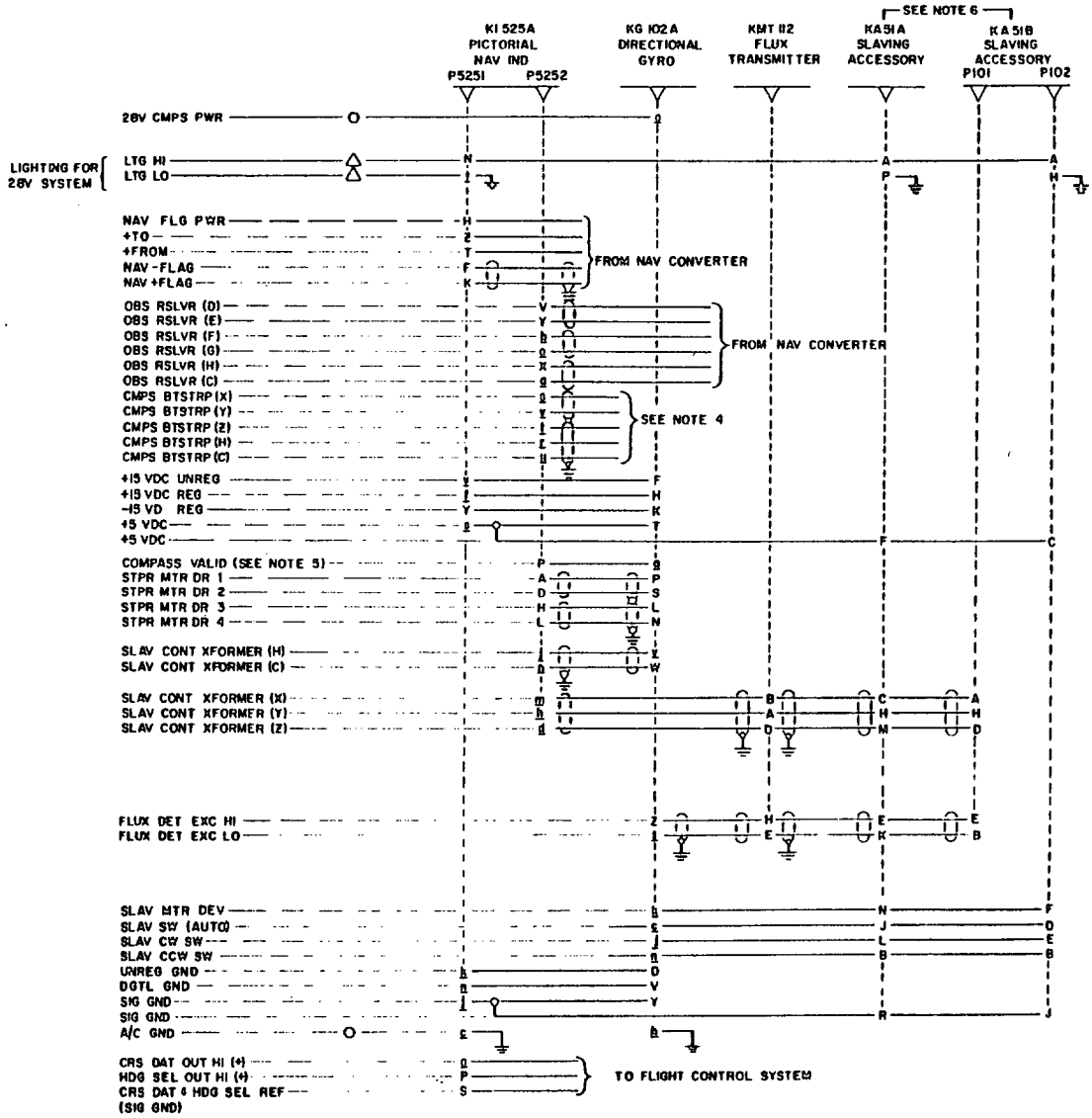
FIGURE 10-F KAP 150/KFC 150 ELECTRICAL INTERCONNECT (28V)
(155-9197-00, Sheet 7 of 12)



NOTES:

1. WIRES MARKED ○ ARE 18 AWG
   WIRES MARKED □ ARE 20 AWG
   WIRES MARKED △ ARE 22 AWG
   UNMARKED WIRES ARE 24 AWG
2. WIRES MARKED ✱ ARE TIED TO A/C GND AS CLOSE TO THE UNIT AS POSSIBLE. WHEN MORE THAN ONE WIRE IS BROUGHT TO COMMON GND, USE SPECIFIED GAUGE WIRE TO TIE POINT. USE 18 AWG FROM THE TIE POINT TO GND.
3. CONNECT VERTICAL GYRO REFERENCE TO POWER GROUND AT PIN E OF KI256/KG258.
4. PINS N & S OF KI 256 MUST BE RETURNED TO P-1922-A, AND MUST NOT BE JUMPERED TO PIN F OF KI 256. WHEN KG 258 IS USED, PINS N & S ARE NOT USED.
5. NUMBERS IN PARENTHESES INDICATE KI 525A PIN NUMBERS WHEN KCS 55A COMPASS SYSTEM IS INSTALLED INSTEAD OF KG 107. SEE KCS 55A INTERCONNECT PAGE FOR COMPLETE WIRING INFORMATION.
6. SHIELDS ARE TO BE COMMON AT ONE END ONLY. FLOAT ALL SHIELDS ON FAR END.
7. PIN 1 OF P19x1 MUST BE JUMPERED TO SIG GND AT PIN 10, P19x2 WHEN THE KG 107 IS INSTALLED. WHEN THE KCS-55A COMPASS SYSTEM IS INSTALLED, PIN 1 OF P19x1 MUST BE CONNECTED TO PIN P OF P5252 AND THE JUMPER TO SIG GND MUST BE OMITTED.
8. THE KG 107 IS NOT APPROVED FOR USE WITH KFC 150.

FIGURE 10-F KAP 150/KFC 150 ELECTRICAL INTERCONNECT (28V)
(155-9197-00, Sheet 8 of 12)



NOTES:
1. WIRES MARKED ○ ARE 018AWG
   WIRES MARKED □ ARE 020AWG
   WIRES MARKED △ ARE 022AWG
   UNMARKED WIRES ARE 024 AWG
2. FOR COMP SYSTEM OPTIONS AND MECHANICAL INSTALLATION PROCEDURES, REFER TO THE KCS55A INSTALLATION MANUAL.
3. UNLESS OTHERWISE NOTED, ALL GROUNDS ARE TO BE TIED TO AIRCRAFT GROUND AS CLOSE TO EACH UNIT AS POSSIBLE.
4. THE COMPASS BOOTSTRAP OUTPUT IS PROVIDED ON THE KI 525A, 006-3046-01 INDICATOR ONLY.
5. ADDITIONAL CONNECTIONS FOR KI 525A CAN BE FOUND ON THE KAP 100/KAP 150/KFC150 INTERCONNECT.
6. BOTH THE KA51A AND KA51B SLAVING ACCESSORIES ARE SHOWN. ONLY ONE IS REQUIRED. IGNORE ANY WIRE CONNECTIONS OR SHIELDS AT THE UNIT THAT IS NOT BEING USED.

FIGURE 10-G KCS 55A ELECTRICAL INTERCONNECT (28V)
(155-9197-00, Sheet 9 of 12)

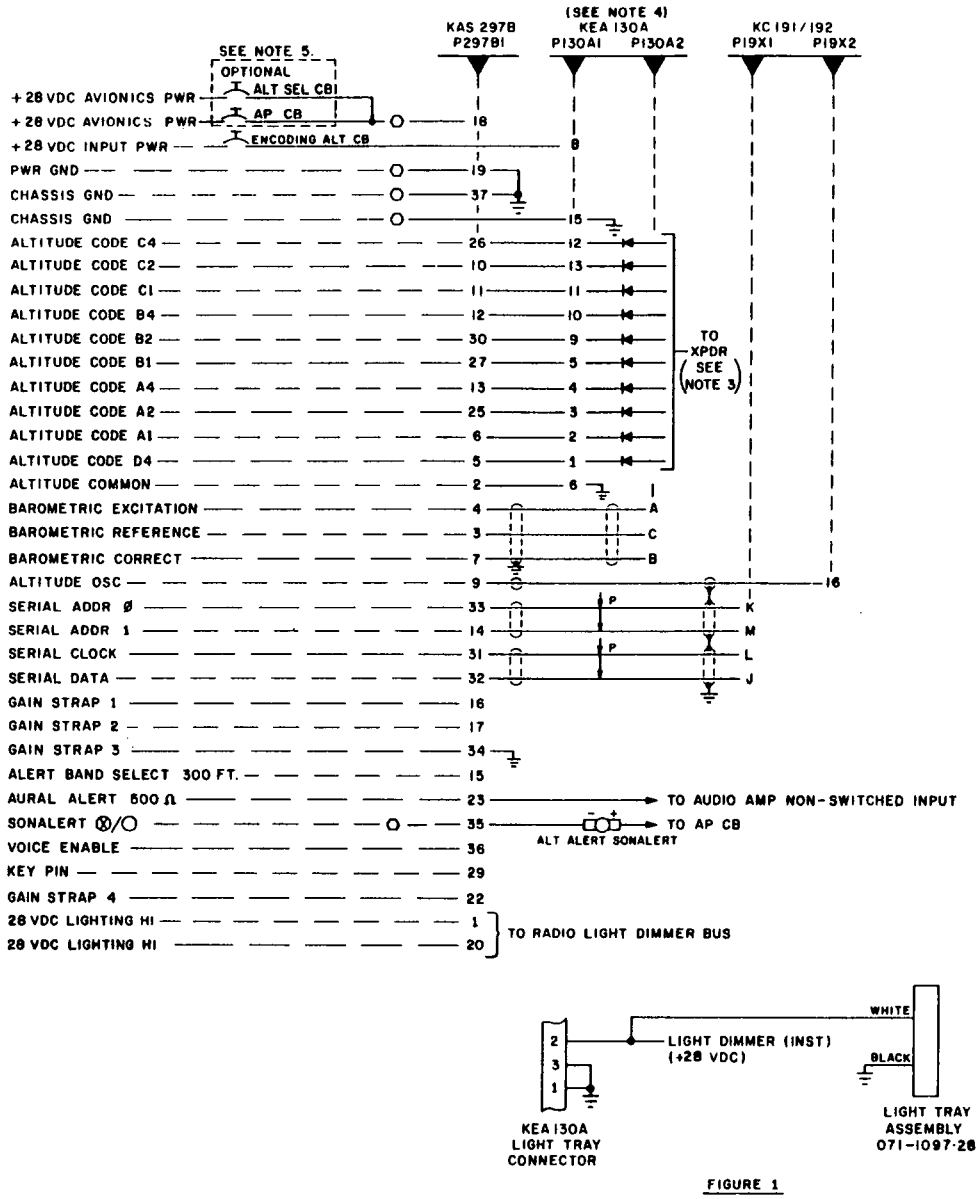
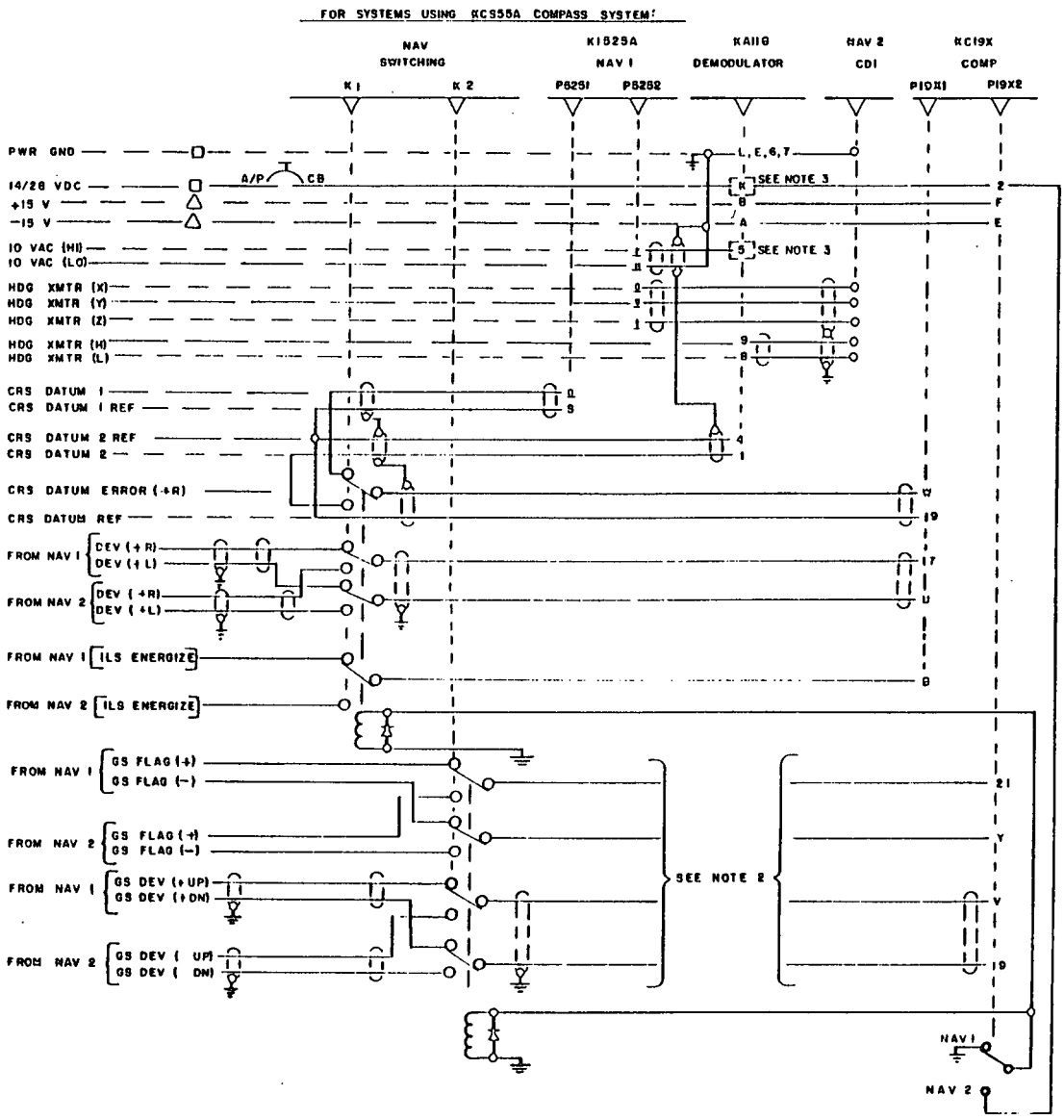


FIGURE 1

NOTES:

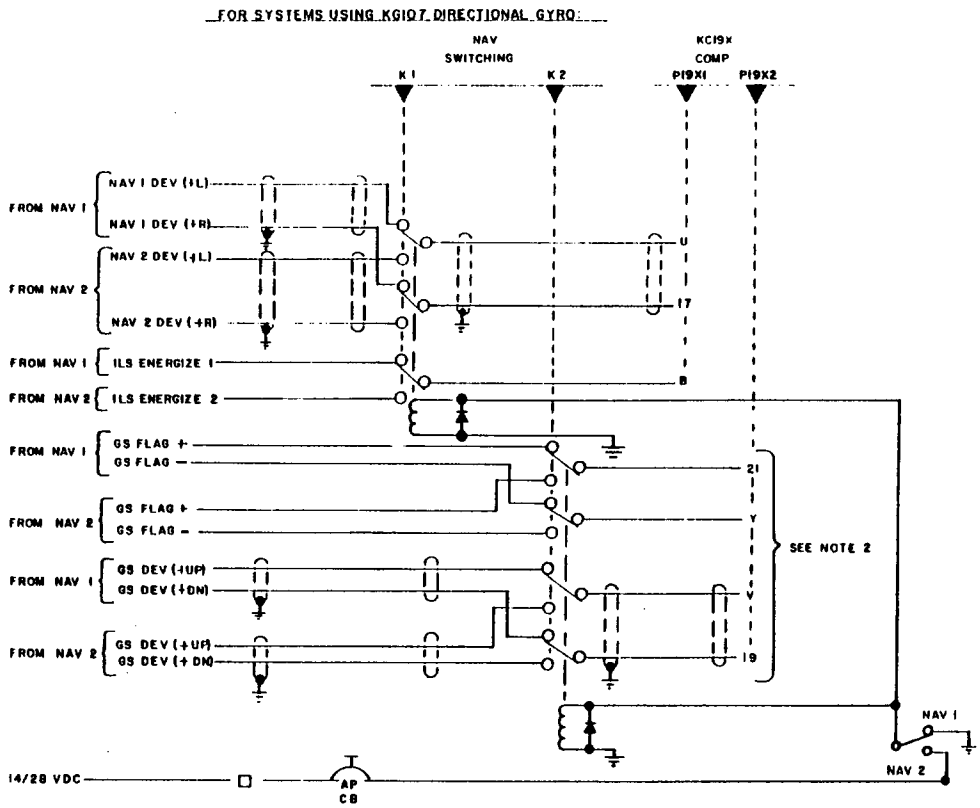
1. UNLESS OTHERWISE NOTED ALL WIRES ARE 24 AWG.
2. WIRES MARKED ○ ARE 18 AWG.
3. DIODE ISOLATION AT THE TRANSPONDER IS REQUIRED FOR CORRECT SYSTEM OPERATION. IF THE TRANSPONDER USED DOES NOT HAVE INTERNAL ISOLATION DIODES, INSTALL AN IN4003 OR EQUIVALENT DIODE ON EACH CODE LINE INTO THE UNIT.
4. CONNECTOR WIRING FOR THE KEA 130A REQUIRED LIGHT TRAY ASSEMBLY IS SHOWN IN FIGURE 1.
5. THE KAS 297B MAY BE POWERED BY THE AP BUS OR THRU A SEPARATE 1A ALT SEL CB.

FIGURE 10-H OPTIONAL KAS 297B ELECTRICAL INTERCONNECT (28V)
(155-9197-00, Sheet 10 of 12)



NOTES:
1. WIRES MARKED □ ARE ⌀ 20 AWG
   WIRES MARKED △ ARE ⌀ 22 AWG
   UNMARKED WIRES ARE ⌀ 24 AWG
2. IF KAP100 SYSTEM IS INSTALLED GLIDE SLOPE SWITCHING MAY BE OMITTED.
3. WHEN AN OPTIONAL EXTERNAL INVERTER IS USED, A KAIIG-01 MUST BE USED, AND THE FOLLOWING PINS MUST CHANGE. PIN K BECOMES OPEN AND PIN 9 BECOMES 26 VAC INPUT.

FIGURE 10-I AUTOPILOT NAV SWITCHING INTERCONNECT
(155-9197-00, Sheet 11 of 12)



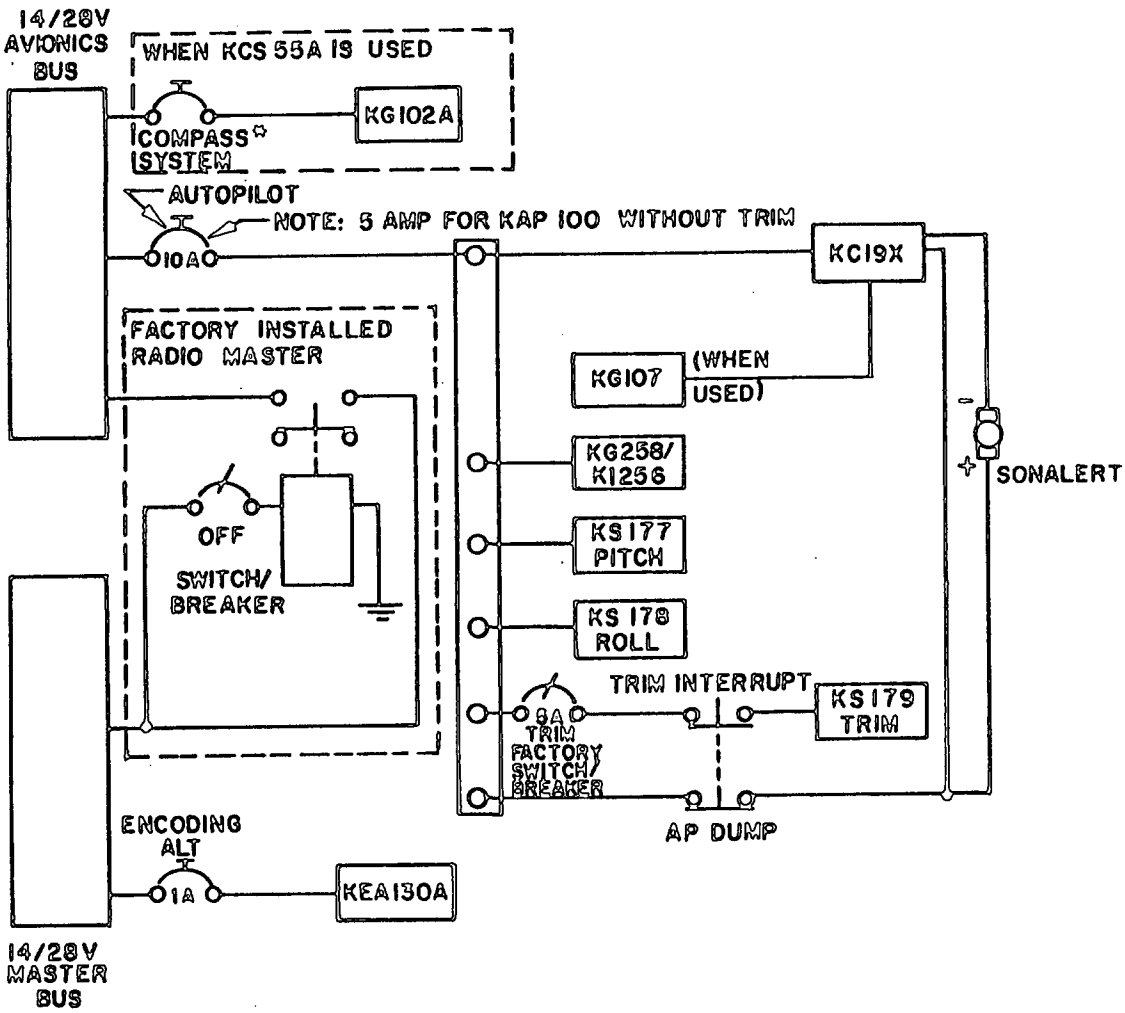
NOTES: 1. WIRES MARKED □ ARE #20 AWG
WIRES MARKED △ ARE #22 AWG
UNMARKED WIRES ARE #24 AWG

2. IF KAP 100 SYSTEM IS INSTALLED GLIDE SLOPE SWITCHING MAY BE OMITTED.

FIGURE 10-I AUTOPILOT NAV SWITCHING INTERCONNECT
(155-9197-00, Sheet 12 of 12)

10.2 POWER DISTRIBUTION

Figure 10-J shows the power distribution for the KAP 100, KAP 150 and KFC 150 Systems.



* WHEN A KCS 55A COMPASS SYSTEM IS TO BE INSTALLED, REFER TO THE KCS 55A INSTALLATION MANUAL (KPN 006-0111-XX) FOR CIRCUIT BREAKER VALUES.

FIGURE 10-J POWER DISTRIBUTION

SECTION ELEVEN

GROUND CHECKS AND FLIGHT ADJUSTMENTS

11.0.1 TEST EQUIPMENT REQUIRED

A. Digital Voltmeter

B. Nav 401L Ramp Generator or equivalent

C. Ground Power Unit (GPU)

D. Pressure or vacuum source of 4.5 ±.5 in. Hg. for vertical gyro (A well filtered and regulated source is essential for correct gyro operation.)

E. Small electronic alignment tool (for potentiometer adjustments)

F. KTS 158 Autopilot tester

G. Tilt stand from KTS 150 Autopilot tester

H. KI 256/KG 258 Gyro simulator (or KI 256/KG 258 mounted in tilt stand).

11.0.2 PRE-OPERATIONAL CHECK

For operator convenience, the 150 Series Flight Control System checkout procedures are broken down into the following categories:

A. Section 11.1: KFC 150 System with KCS 55A Compass System. KAP 150 System with KCS 55A Compass System or KG 107 Directional Gyro.

B. Section 11.2: KAP 100 System with either KCS 55A Compass System or KG 107 Directional Gyro and with or without Manual Electric Trim.

C. Section 11.3: Optional KAS 297B Vertical Speed and Altitude Selector.

11.0.3 SYSTEM COOLING

A. The KFC 150, KAP 150 and KAP 100 Systems all require forced air cooling for their respective Flight Computers. Proper installation and adequate air flow through the computer must be verified to assure safe and reliable operation of the Flight Control System.

B. During system tests, forced air cooling must be provided to the computer if ground run time exceeds 15 minutes, or the computer may be opened to expose the unit power supply for ambient air cooling.

11.1 CHECKOUT PROCEDURES FOR KFC/KAP 150 SYSTEMS WITH KCS 55A OR KG 107

11.1.1 GENERAL

The following KFC/KAP 150 System installation checkout procedure is required prior to first flight. If problems are encountered in performing these procedures, the installer may refer to Section 10 of this manual for harness troubleshooting or the System Maintenance Manual to isolate faulty equipment.

11.1.1.1 (OPTIONAL) REMOTE MODE ANNUNCIATOR

The KA 185 Mode Annunciator is optional as a secondary "repeat" indicator for all systems. With the exception of ARM and CPLD all KA 185 Annunciator indications are the same as those on the KC 19X computer. The KC 19X computer will "flash" NAV or APR for an arm indication while the KA 185 will annunciate NAV or APR "ARM". The KC 19X computer will illuminate a "steady" NAV or APR for a coupled indication while the KA 185 will annunciate NAV or APR "CPLD".

11.1.2 COMPASS SYSTEM CHECK

Insure that the KCS 55A or the KG 107 has been installed in accordance with the appropriate installation manual. If any problems arise with the system while performing the checkout procedures, refer to the appropriate maintenance/overhaul manual. The KCS 55A will require swinging on the compass rose prior to flight as per the adjustment procedure in the KCS 55A Pictorial Navagation System Installation Manual.

11.1.3 GYRO ALIGNMENT PROCEDURES

The following system alignment is required in the KFC/KAP 150 System:

A. Remove the KC 191/192 Computer from the airplane panel. Connect the computer to the autopilot tester with the cables provided.

B. Mount the gyro in the gyro tilt stand. Place the tilt stand in a convenient location with reference to the autopilot computer. Level the tilt stand using the twist adjust knobs and bubble level. Connect the gyro air input to a regulated 4.5 in. Hg. source. Connect the KI 256/KG 258 Flight Command Indicator to the airplane harness using gyro extender cable.

NOTE

A PROPERLY REGULATED AND FILTERED AIR SOURCE IS ESSENTIAL FOR CORRECT GYRO OPERATION.

NOTE

WHEN MAKING GYRO ALIGNMENT ADJUSTMENTS, ALWAYS HAVE GYRO SET TO ZERO IN AXIS NOT UNDER TEST.

C. Before applying power, make sure that the proper adapter boards are installed in the KC 191/192 by checking the part numbers in the windows on the top and bottom of the unit. Refer to the system parts list for the correct numbers. Apply power to the system. All associated circuit breakers must be installed and activated.

D. After the gyro is fully erected (ten minutes minimum run-up time), proceed with the following.

E. Set the gyro stand to zero in both pitch and roll axis. Adjust leveling screws for pitch and roll zero visual indication.

F. Adjust R286, Roll Null Adjust for 0.0 VDC. This is a potentiometer which is accessible through the hole labeled RN in the front of the computer. Measure the voltage from J19X1 (22) to the signal ground J19X2 (10) with a digital voltmeter when making this adjustment.

G. Adjust R1148 Pitch Null Adjust for 0.0 VDC. This pot is accessible through the hole labeled PDN on the right hand side of the computer. Measure the voltage from TC101 (top board test connector), pin A4 to signal ground with a digital voltmeter.

H. Tilt the gyro to a twenty-five degree right bank using the gyro tilt stand. Adjust R110, accessible through the hole labeled RDG on the right side of the computer, for −5 ±0.1 VDC. Measure the voltage at J19X1 (22) with respect to signal ground.

I. Tilt the gyro to a twenty-five degree left bank using the gyro tilt stand. Measure the voltage at the same point as Step H. It should read +5 ±0.1 VDC.

If the reading in Step I exceeds +5.1 VDC, repeat Step H and reduce the gain by one-half the amount exceeded in Step I. If Step I measured less than +4.9 VDC, repeat Step H and increase the gain setting by one-half the amount short in Step I. Repeat until there is a balance between left and right bank. The proper total voltage excursion should be 10 ±.2 VDC.

J. With the gyro test stand in the zero pitch position, adjust the leveling screws on the test stand to obtain a pitch zero visual indication on the vertical gyro. (Horizon line aligned with 90° index marks.)

K. Tilt the gyro ten degrees nose down on the tilt stand and adjust R1151, a potentiometer located on the right side of the computer through the hole labeled PDG, for +2 ±0.1 VDC. Measure the voltage at TC 101 (A4) to signal ground.

L. Tilt the gyro ten degrees nose up on the tilt stand. The meter should read −2 ±0.1 VDC at the same point as Step K. If the meter exceeds −2.1 VDC, repeat Step K and reduce the gain by one-half the amount exceeded in Step L. If the meter reads less than −1.9 VDC, repeat Step K and increase the gain by one-half the amount short in Step L.

11.1.4 GROUND CHECKS

NOTE

DUE TO THE ATTITUDE LIMITS BUILT INTO THE KFC/KAP 150 AUTOPILOT SYSTEM, THE AUTOPILOT MAY NOT ENGAGE IF THE GYRO IS TUMBLED. THEREFORE, IT IS RECOMMENDED THAT THE KI 256/KG 258 BE MOUNTED IN THE TILT STAND AND FULLY UP TO SPEED (OR SIMULATOR SET TO ZERO) FOR THE FOLLOWING CHECKS.

11.1.4.1 SELF TEST

Check that the AUTOPILOT and COMP SYSTEM circuit breakers are in. Apply power to the system by turning on the Radio Master and Elev Trim switches. With all modes disengaged, the TRIM annunciator should be illuminated and all other annunciators off. Press the test switch on the KC 191/192. All annunciators should illuminate. The TRIM Fault Annunciator should flash 4 times. At the completion of the self test, all annunciators except AP should go out. The AP annunciator will flash approximately 12 times before going out and an aural alert will sound to indicate a successful test.

11.1.4.2 CONTROL WHEEL SWITCH CHECKS

A. Actuate the left side of the split manual electric trim switch to the fore and aft positions. This should engage the trim servo clutch. Check this by manually rotating the trim wheel; increased force will be necessary to override the torque of the clutch. The trim wheel should not move on its own.

B. Actuate the right side of the split switch to the fore and aft positions. The trim servo clutch should not engage and the wheel should not turn. Manually rotate trim wheel; it should rotate freely.

C. Actuate both switches to the fore (nose down) and aft (nose up) positions. The trim clutch should engage and the trim wheel should drive in the directions indicated.

D. Press the AP DISC/TRIM INTER switch down and hold. Actuate manual electric trim. Trim should not run in either direction.

E. If using KFC 150 System, depress CWS switch, FD annunciator should illuminate and command bars on KI 256 should be in view.

F. Engage the autopilot. With FD System, FD must be engaged first. Press the CWS switch. The servos should release. Check for free control wheel movement in both axes.

G. Release the CWS switch and depress the AP DISC/TRIM INTER switch. If FD System, FD will extinguish. The AP annunciator will flash then extinguish. The aural alerter should sound and the servo clutches should disengage. Check for free control wheel movement in both axes.

11.1.4.3 AUTOPILOT OVERPOWER CHECK

Engage the AP. Apply force to the controls to determine if the AP can be overpowered.

11.1.4.4 AUTOPILOT DISCONNECT CHECKS

The following conditions should disengage the autopilot modes:

A. Pressing the pilot's AP DISC/TRIM INTER switch will disconnect the AP (and FD if so equipped).

B. Activation of the Manual Electric Trim Switch, either up or down, will disengage all modes in the KAP 150 System; it will disengage only the autopilot in the KFC 150 System.

C. Pulling the AUTOPILOT circuit breaker to the off position. (Requires re-running the pre-flight test before AP will engage.)

D. If the HDG Flag comes into view when any mode is on that uses heading information. (Disengages AP and all lateral modes; airplanes w/KG 107).

E. Excessive roll and/or pitch rates.

NOTE

A FLASHING TWO SECOND AUDIO WARNING WILL SOUND WHENEVER THE AUTOPILOT IS DISENGAGED, EXCEPT WHEN AP CIRCUIT BREAKER IS PULLED.

DEPENDING ON REVISION LEVEL OF INSTALLATION, IF THE AP DISC/TRIM INTER SWITCH IS PRESSED DOWN AND HELD IN FOR THREE SECONDS OR MORE THE AUDIO WARNING WILL NOT SOUND.

11.1.4.5 FD/AP CHECKS

NOTE

IF USING THE GYRO SIMULATOR TO CHECK A KFC 150 SYSTEM, THE FLIGHT DIRECTOR ENGAGE SWITCH MUST BE DEPRESSED TO BRING COMMAND BARS INTO VIEW. COMMAND BARS SHOULD NOT BE LEFT IN VIEW FOR LONG PERIODS OF TIME (5 MINUTES OR MORE) WITHOUT AIR APPLIED TO THE GYRO.

A. Engage the autopilot. Press the Vertical Trim rocker switch on the KC 191/192 to the nose-up position. The control column should drive back. Prevent the column from driving back and after a short delay, the autotrim should begin driving in the nose-up direction. With KFC 150 System, the command bars will indicate nose-up.

B. Depress the CWS switch to sync the system back to zero and repeat Step A in the nose-down direction. The command bars, column and autotrim should respond in a nose down direction.

11.1.4.6 HEADING MODE

With the autopilot engaged, press the HDG switch on the KC 191/192. If the compass/DG is valid, the HDG annunciator will illuminate on the computer. Rotate the heading bug to an increased setting from the lubber line. The control wheel should drive to the right. If using KFC 150 System, command bars will command a right bank. Rotate heading bug to a decreased setting from the lubber line. Control wheel should drive left and command bars should display left bank.

11.1.4.7 APPROACH MODE

11.1.4.7.1 THE FOLLOWING ARE APPROACH MODE CHECKS FOR A KCS 55A COMPASS SYSTEM. (REFER TO 11.1.4.8.1 FOR KG 107 DIRECTIONAL GYRO)

A. With the KI 256/KG 258 level (or the Gyro Simulator set to zero), set the test generator to a VOR frequency and select the test frequency on the Nav receiver. Set the bearing selector on the test generator to the same bearing as the airplane heading and select a course to give full scale deviation. Engage the HDG mode and the APR mode. HDG should illuminate and the APR annunciator will flash, indicating approach arm.

B. Slowly change the course selector to center the deviation. The system will automatically go from APR arm and HDG to APR coupled when the computed capture point is reached. The HDG annunciator will go out and the APR annunciator will cease flashing and remain on steady.

C. Set the course selector on the KI 525A to the lubber line and change the bearing selector to give full scale left deflection. With the KFC 150 System the command bars should roll to the left, in the KAP 150 System the control wheel should roll to the left. Change the bearing selector to give full scale right deflection. With the KFC 150 System the command bars should roll to the right, in the KAP 150 System the control wheel should roll to the right.

D. With a full scale right deflection displayed, rotate the course selector on the KI 525A counterclockwise. In the KFC 150 System this will center the roll command bar, with the KAP 150 System this will stop the control wheel. The course will be a 40 $\pm 7^{\circ}$ decreased heading from the lubber line. Set the test generator bearing selector for a full left deflection and rotate the course selector clockwise until, with the KFC 150 System, the command bars are zeroed; with the KAP 150 System the control wheel stops. The course will be a 40 $\pm 7^{\circ}$ increased heading from the lubber line.

11.1.4.7.2 GLIDESLOPE MODE

A. With the KI 256/KG 258 level (or Gyro Simulator at zero), select a glideslope signal on the test generator and set the NAV Receiver to the same frequency. Adjust the test generator to give a maximum up deviation on the KI 525A and a centered LOC DEV indication. APR will illuminate. (With the KAP 150 System the Autopilot must be engaged first.)

B. Slowly move the glideslope deviation toward center. When the deviation reaches center, the GS Annunciator will illuminate, indicating GS coupled. Further movement of the GS deviation will cause a down command from the AP/FD. A glideslope up deviation will cause an up command from the AP/FD.

C. If the KTS 158 Test Set is being used, check the glideslope gain switching signal by tuning the NAV generator to provide a middle marker test signal. Measure the voltage between P1912 Pin R and P1912 Pin 15 on the KTS 158. The voltage should be 3.5 $\pm$.5VDC.

11.1.4.8 THE FOLLOWING APPROACH MODE CHECK IS FOR KAP 150 SYSTEMS WITH THE KG 107 DIRECTIONAL GYRO

A. With the KG 258 level (or the GYRO Simulator set to zero), set the test generator to a VOR frequency and select the test frequency on the NAV receiver. Set the bearing selector on the test generator to the same bearing as the airplane heading and adjust the OBS knob on the NAV Indicator to give full scale deviation. Set the HDG SEL/CRS DAT bug on the lubber line. Engage the HDG mode and the APR mode. HDG should illuminate and the APR annunciator will flash, indicating approach arm. After a 5 second delay, the autopilot will command a roll in the direction of the indicated deviation.

B. Slowly rotate the HDG SEL/CRS DAT bug in the direction opposite of the deviation until the autopilot stops driving. The bug should be at 45° $\pm$5° from the lubber line. Slowly change the OBS knob to center the deviation. The system will automatically go from APR arm and HDG to APR coupled when the computed capture point is reached. The HDG annunciator will go out and the APR annunciator will cease flashing and remain on steady. Set the HDG SEL/CRS DAT bug on the lubber line, the autopilot will cease driving (may creep).

C. With HDG SEL/CRS DAT bug on the KG 107 set under the lubber line, change the bearing selector to give a full scale left deflection. The control wheel should roll to the left. Change the bearing selector to give full scale right deflection. The control wheel should roll to the right.

D. With a full scale right deflection displayed, rotate the bug on the KG 107 counterclockwise to stop the control wheel. The course will be a 40 $\pm$7° decreased heading from the lubber line. Set the test generator bearing selector for a full scale left deflection and rotate the bug clockwise until the control wheel stops. The course will be 40 $\pm$7° increased heading from the lubber line.

11.1.4.8.1 GLIDESLOPE MODE (KAP 150 SYSTEM)

A. With the KG 258 level (or GYRO Simulator at zero), select a glideslope signal on the test generator and set the NAV receiver to the same frequency. Adjust the test generator to give a maximum up deviation on the NAV Indicator and a centered localizer deviation indication. APR will illuminate when APR switch is pressed. Autopilot must be engaged first.

11.1.4.8.1 (Continued)

B. Slowly move the glideslope deviation toward center. When the deviation reaches center, the GS Annunciator will illuminate, indicating GS coupled. Further movement of the glideslope deviation will cause the control column to drive in pitch. A glideslope deviation up will cause a nose up movement.

C. If the KTS 158 Test Set is being used, check the glideslope gain switching signal by tuning the NAV generator to provide a middle marker test signal. Measure the voltage between P1912 pin R and P1912 Pin 15 on the KTS 158. The voltage should be 3.5 ±.5v.

11.1.5 INFLIGHT CHECKS AND ADJUSTMENTS (With all units installed and all test equipment removed)

This checkout should be run on all new installations and any time there has been a major system rework or airplane wiring change.

THE AUTOPILOT MUST BE OPERATED IN ACCORDANCE WITH THE APPROVED FLIGHT MANUAL SUPPLEMENT.

11.1.5.1 PRE-FLIGHT CHECKOUT

Prior to take off, perform the pre-flight checkout as outlined in the appropriate Airplane Flight Manual Supplement.

11.1.5.2 IN-FLIGHT CHECKS

A. ALT HOLD CHECKS

Hand fly the airplane to a safe altitude. Manually trim the airplane for a maximum climb rate. Engage the autopilot by pressing AP switch on the front of the KC 191/192 Computer (KC 192 will require the FD to be engaged first). The AP Annunciator will illuminate and the autopilot will take over control of the airplane. While climbing at best rate of climb speed, engage the ALT mode. The ALT Annunciator will illuminate and the airplane will smoothly round out and return to the altitude at which engaged.

Fly on ALT Hold for five minutes at a cruise power setting. The system should be stable with no noticeable porpoising. Increase to full power while flying on altitude hold. Observe that the autotrim will run in the nose down direction to compensate for the increased airspeed. Allow the trim to stabilize the airplane. The altitude should be at the original value ±20 feet. Reduce power to cruise speed and allow the system to stabilize.

With the KC 191/192 system in ALT Hold and AP engaged, use the Vertical Trim switch on the KC 191/192 Flight Computer to trim the altitude up 250 feet, then trim down 250 feet. The altitude will change smoothly and will stabilize at a climb or descent rate of about 500 feet per minute.

B. GYRO ZEROING ADJUSTMENT

With the airplane in cruise flight condition and on ALT Hold, disconnect the Autopilot. The Autotrim should have the airplane in trim until no appreciable transient can be observed. Hand fly the airplane and observe the KI 256/KG 258 Horizon Indicator with the wings level. Due to gyro manufacturing tolerances and the possibility of a misaligned instrument mounting, some small bank angle may be displayed. A releveling of the KI 256/KG 258 in the panel should be considered if the angle displayed with the wings level is more than two degrees.

11.1.5.2 (Continued)

1. ROLL ADJUSTMENT

At a safe altitude and with the airplane trimmed for straight and level flight, engage the autopilot. The autopilot should hold the airplane at the pitch angle present when engaged and at zero roll attitude as indicated on the KI 256/KG 258 roll display. If the airplane does not maintain zero roll attitude, an adjustment of the KC 191/192 R286 roll adjust pot (RN) is required. Adjust the control as necessary for a zero roll indication. Adjustment should be made slowly to avoid over compensation.

2. COMMAND BAR ADJUSTMENTS (KFC 150 SYSTEM ONLY)

In-flight adjustment of the command bars is necessary if, when flying straight and level, the command bars are not zeroed in either axis. The pitch and roll command bar adjust pots are accessible through the face of the computer. R275 is the Roll Command Bar adjust and R276 is the Pitch Command Bar adjust. These are labeled RC and PC, respectively. With the wings level, adjust R275 for a zero degree roll command on the command bars. With the airplane flying level in pitch, adjust R276 for a zero degree pitch command on the command bars. These are visual indications.

C. BASIC AP/FLT DIR CHECKS

With the system flying on FD mode (only KFC 150 uses FD) and Autopilot engaged in level flight cruise configuration, press the CWS switch on the pilot's control wheel. Manually change the heading and pitch attitude. Release the CWS switch and the airplane should return to wings level and remain at the pitch attitude present when the switch was released if it is not greater than +15, -10 degrees.

D. HDG SEL CHECKS (Cruise Configuration)

Set the HDG bug on the KPI 525 or the HDG SEL/CRS DAT bug on the KG 107 to a 90 degree increase in heading and engage the HDG mode. (If KFC 150 System is used, command bars on the KI 256 will command a right bank.) The Autopilot will bank the airplane up to 20° $\pm 3^{\circ}$ right bank. The airplane will roll out on the selected heading with no overshooting. Repeat the test using a 90° decrease in selected heading. If the system flies with a HDG bug offset of 3° or more, airplane trim should be checked closely as well as the KI 256/KG 258 Gyro installation in the airplane panel for proper leveling.

11.1.5.3 THE FOLLOWING ARE NAVIGATION CHECKS FOR KCS 55A COMPASS SYSTEM. (Refer to 11.1.5.4 for KG 107 Directional Gyro.)

A. NAV CHECKS

Select an omni station at approximately twenty miles distance and set in the desired course on the Pictorial Navigation Indicator. Select the course by turning the course pointer until the KI 525A deviation indicator is centered in the "TO" position. Then increase or decrease the course selected by ten degrees.

11.1.5.3 (Continued)

Engage the HDG mode and set up an intercept angle of 20° to 60° using the HDG SEL bug. Arm the NAV mode by pressing the NAV switch on the KC 191/192 Computer. The system will fly on HDG until the proper intercept point is reached, where it will automatically switch from HDG, NAV arm (flashing) to NAV coupled (steady). When NAV coupled is achieved, the system will bank the airplane up to the necessary bank angle to execute the turn on to the radial with minimum overshoot. Allow the system to track the radial for five minutes. The system will command the airplane to fly along the radial with no large steering maneuvers.

NOTE

IF THE CDI DEVIATION IS LESS THAN THREE DOTS AND THE BANK ANGLE IS LESS THAN FOUR DEGREES, THE SYSTEM WILL GO TO CPLD AFTER 2 SECONDS IN ARM.

B. APR (ILS) CHECKS

While approaching the station in the HDG mode, tune the LOC receiver and set the course pointer to the published runway inbound heading. Set up an intercept angle of greater than 90° to the inbound course. Arm the APR mode and engage the BC switch in advance of beam interception. The BC annunciator will illuminate and APR will flash on the KC 191/192 Computer. The system will capture and track the localizer outbound. (Some overshoot may occur if the angle is too sharp or if the capture is made extremely close in.) While on the localizer outbound, descend to the desired altitude by using the Vertical Trim switch on the KC 191/192 Computer.

Engage ALT hold when the desired altitude is reached. Set the HDG bug to the procedure-turn heading and press the HDG switch on the KC 191/192. The airplane will turn to the procedure-turn outbound heading. Use the HDG mode to complete the procedure-turn. When the airplane is within 90° of the inbound course, press the APR switch on the KC 191/192. With the APR mode armed, set up a 45° intercept angle using the HDG mode. When the proper intercept is reached, the system will automatically transfer from HDG, APR arm (flashing) to APR coupled (steady) and turn on to the inbound localizer. As the airplane flies into the glideslope beam, the automatic capture circuit will transfer from ALT hold to GS, as displayed on the KC 191/192 Computer.

Establish the airplane in the approach configuration. Set the HDG bug to the go around heading. When desired, disconnect the autopilot by use of the AP DISC/TRIM INTER Switch.

C. APR (VOR) CHECKS

Using the published VOR approach information, set the course selector on the Pictorial Navigation Indicator to the inbound course. Use the HDG mode to set up a 45° intercept of the VOR radial. Arm the approach mode by pressing the APR switch while the deviation is still full scale. When the proper intercept point is reached, the system will go from HDG, APR arm (flashing) to APR coupled (steady). Use Pitch Attitude Hold and Vertical Trim to maintain the desired descent rate while on the approach. When desired, execute missed approach procedure or disengage the autopilot and execute a landing.

11.1.5.4 THE FOLLOWING ARE NAVIGATION CHECKS FOR THE KG 107 DIRECTIONAL GYRO

A. NAV CHECKS

Select a VOR station at approximately twenty miles distance and set in the desired course by turning the OBS knob until the NAV Indicator deviation is centered in the "TO" position. Then increase or decrease the course selected by ten degrees.

Engage the HDG mode and set up an intercept angle of 90° using the HDG SEL/CRS DAT bug. Arm the NAV mode by pressing the NAV switch on the KC 191 Computer and turning the HDG SEL/CRS DAT bug to the radial selected on the NAV Indicator. The NAV Annunciator will flash to indicate NAV arm mode and after a 5 second delay the airplane will turn to make a 45° intercept of the radial selected. As the airplane approaches the radial it will automatically switch from HDG, NAV arm to NAV coupled. When NAV coupled is achieved, the NAV Indicator will cease flashing and remain on, the autopilot will bank the airplane up to the necessary bank angle to execute the turn on to the radial with minimum overshoot. Allow the autopilot to track the radial for five minutes. The autopilot will command the airplane to fly along the radial with no large steering maneuvers.

NOTE

IF THE CDI DEVIATION IS LESS THAN THREE DOTS AND THE BANK ANGLE IS LESS THAN FOUR DEGREES, THE SYSTEM WILL GO TO CPLD AFTER 2 SECONDS IN ARM.

B. APR (ILS) CHECKS

While approaching the station in the HDG mode, tune in the LOC receiver and set the OBS knob to the published runway inbound heading. Set up an intercept angle of greater than 90° to the inbound course. Engage the BC switch and turn the HDG SEL/CRS DAT bug on the KG 107 to the localizer inbound course. The BC annunciator will illuminate and the APR annunciator will flash to indicate APR arm mode. After a five second delay the airplane will turn to make a 45° intercept of the localizer outbound course. The autopilot will capture and track the localizer outbound. While on the localizer outbound, descend to the desired altitude by using the Vertical Trim switch on the KC 191 Computer.

Engage ALT hold when the desired altitude is reached. Set the HDG SEL/CRS DAT bug to the procedure-turn heading and press the HDG switch on the KC 191. Use HDG mode to complete the procedure turn. When the airplane is within 90° of the inbound course, press the APR switch on the KC 191 and turn the bug to the localizer inbound course. The autopilot will set up a 45° intercept angle automatically. When the proper intercept is reached, the autopilot will switch from HDG, APR arm (flashing) to APR coupled (steady) and turn onto the inbound localizer. As the airplane flies into the glideslope beam, the automatic capture circuit will transfer from ALT hold to GS, as displayed on the KC 191 Computer.

Establish the airplane in the approach configuration. When desired, disconnect the autopilot by use of the AP DISC/TRIM INTER Switch.

11.1.5.4 (Continued)

C. APR (VOR) CHECKS

Using the published VOR approach information, set the OBS knob on the NAV Indicator to the inbound course. Arm the APR mode by pressing the APR switch on the KC 191 while the deviation is still full scale and turn the HDG SEL/CRS DAT bug to the inbound course. The APR annunciator will flash to indicate APR arm mode. After a five second delay the airplane will turn to make a 45° intercept of the inbound radial. When the proper intercept point is reached, the autopilot will go from APR arm (flashing) to APR coupled (steady). Use Pitch Attitude Hold and Vertical Trim to maintain the desired descent rate while on the approach. When desired, execute missed approach procedure or disengage the autopilot and execute a landing.

THIS CONCLUDES THE NORMAL INSTALLATION FLIGHT CHECK OF THE KFC 150/KAP 150 SYSTEM WITH KI 256 AND KG 258.

11.2 CHECKOUT PROCEDURE FOR KAP 100 SYSTEM WITH KCS 55A COMPASS SYSTEM OR KG 107 DIRECTIONAL GYRO AND WITH OR WITHOUT MANUAL ELECTRIC TRIM OPTION.

11.2.1 GENERAL

The KAP 100 System installation checkout procedure is required prior to first flight. If problems are encountered in performing these procedures the installer may refer to Section 10 of this manual for harness troubleshooting or the System Maintenance Manual to isolate faulty equipment.

11.2.1.1 NOT USED.

11.2.2 COMPASS SYSTEM CHECK

Insure that the KCS 55A or the KG 107 has been installed in accordance with the appropriate installation manual. If any problems arise with the system while performing the checkout procedures, refer to the appropriate maintenance/overhaul manual. The KCS 55A will require swinging on the compass rose prior to flight as per the adjustment procedures in the KCS 55A Pictorial Navigation System Installation Manual.

11.2.3 GYRO ALIGNMENT PROCEDURES

The following alignment procedures are required in the KAP 100 System:

A. Remove the KC 190 Computer from the airplane panel. Connect the computer to the autopilot tester with the provided cables.

B. Mount the gyro in the gyro tilt stand. Place the tilt stand in a convenient location with reference to the autopilot computer. Level the tilt stand using the twist adjust knobs and bubble level. Connect the gyro air input to a regulated 4.5 in. Hg. source. Connect the KG 258 Flight Command Indicator to the airplane harness using the gyro extender cable.

NOTE

A PROPERLY REGULATED AND FILTERED AIR SOURCE IS ESSENTIAL FOR CORRECT GYRO OPERATION.

NOTE

WHEN MAKING GYRO ALIGNMENT ADJUSTMENTS, ALWAYS HAVE GYRO SET TO ZERO IN AXIS NOT UNDER TEST.

C. Before applying power, make sure that the proper adapter boards are installed in the KC 190 by checking the part numbers in the windows on the top and bottom of the unit. Refer to the system parts list for the correct numbers. Apply power to the system. All associated circuit breakers must be installed and activated.

D. After the gyro is fully erected (ten minutes minimum run-up time), proceed with the following.

11.2.3 (Continued)

E. Set the gyro stand to zero in both pitch and roll axis. Adjust leveling screws for pitch and roll zero visual indication.

F. Adjust R286, Roll Null adjust for 0.0 VDC. This is a potentiometer which is accessible through the hole labeled RN in the front of the computer. Measure the voltage from J1921 (22) to the signal ground J1922 (10) with the digital voltmeter when making this adjustment.

G. Tilt the gyro to a twenty-five degree right bank using the gyro tilt stand. Adjust R110, accessible through the hole labeled RDG on the right side of the computer, for -5 ±0.1 VDC. Measure the voltage at J1921 (22) with respect to signal ground.

H. Tilt the gyro to a twenty-five degree left bank using the gyro tilt stand. Measure the voltage at the same point as Step G. It should read +5 ±0.1 VDC.

If the reading in Step I exceeds +5.1 VDC, repeat Step H and reduce the gain by one-half the amount exceeded in Step I. If Step I measured less than +4.9 VDC, repeat Step H and increase the gain setting by one-half the amount short in Step I. Repeat until there is a balance between left and right bank. The proper total voltage excursion should be 10 ±.2 VDC.

11.2.4 GROUND CHECKS

Due to the attitude limits built into the KAP 100 System the autopilot may not engage if the gyro is tumbled. Therefore, it is recommended that the KG 258 be mounted in the tilt stand and fully up to speed (or simulator set to zero) for the following checks.

11.2.4.1 SELF TEST

Check that the AUTOPILOT, and COMP SYSTEM circuit breakers are in. Apply power to the system by turning on the Radio Master Switch and Elev. Trim switch (If so equipped). With all modes disengaged, the TRIM annunciator should be illuminated (if equipped with Manual Electric Trim). All other modes should be off. Press the test switch on the KC 190. All annunciators should illuminate. The Trim Fault Annunciator should flash 4 times, if equipped with Manual Electric Trim. At the completion of the self test, all annunciators except AP should go out. The AP annunciator will flash approximately 12 times before going out and an aural alert will sound (if equipped with Manual Electric Trim) to indicate a successful test.

11.2.4.2 CONTROL WHEEL SWITCH CHECKS

The following Control Wheel checks are required only if you have a KAP 100 System with Manual Electric Trim.

A. Actuate the left side of the split Manual Electric Trim switch to the fore and aft positions. This should engage the trim servo clutch. Check this by manually rotating the trim wheel; increased force will be necessary to override the torque of the clutch. The trim wheel should not move on its own.

B. Activate the right side of the split switch to the fore and aft positions. The trim servo clutch should not engage and the wheel should not turn. Manually rotate trim wheel; it should rotate freely.

C. Actuate both switches to the fore (nose down) and aft (nose up) positions. The trim clutch should engage and the trim wheel should drive in the directions indicated.

11.2.4.2 (Continued)

D. Press the AP DISC/TRIM INTER switch down and hold. Actuate Manual Electric Trim. Trim should not run in either direction.

E. Engage the autopilot. Press the CWS switch. The servo should release the control wheel. Check for free control wheel movement in the roll axis.

F. Release the CWS switch and depress the AP DISC/TRIM INTER switch. The AP annunciator will flash then extinguish. The aural alerter (if installed) should sound and the servo clutch should disengage. Check for free control wheel movement in the roll axis.

11.2.4.3 AP MODE

A. With the gyro level in the tilt stand (or simulator set to zero), engage the autopilot. The controls will feel stiff and the AP annunciator should illuminate. The control wheel should not drive (may creep).

B. Rotate the vertical gyro (or set simulator) for a right bank. The autopilot should command a left roll to roll back to a wings level position.

C. Rotate the vertical gyro (or set simulator) for a left bank. The autopilot should command a right roll to roll back to wings level. Zero the vertical gyro or simulator.

11.2.4.4 HDG MODE

A. With all modes disengaged, level the vertical gyro (or set simulator to zero) and set the HDG SEL/CRS DAT bug on the KI 525A/KG 107 under the lubber line. Engage the AP and HDG modes. AP and HDG should illuminate on the annunciator panel of the computer

B. Set the HDG SEL/CRS DAT bug to an increased heading from the lubber line. The autopilot should command a right roll.

C. Set the HDG SEL/CRS DAT bug to a decreased heading from the lubber line. The autopilot should command a left roll.

11.2.4.5 APR MODE

11.2.4.5.1 THE FOLLOWING ARE APPROACH CHECKS FOR A KCS 55A COMPASS SYSTEM. (Refer to 11.4.5.2 for KG 107 Directional Gyro.)

A. With the KG 258 level (or the Gyro Simulator set to zero), set the test generator to a VOR frequency and select the test frequency on the Nav receiver. Set the bearing selector on the test generator to the same bearing as the airplane heading and select a course to give full scale deviation. Engage the HDG mode and the APR mode. HDG should illuminate and the APR annunciator will flash, indicating approach arm.

B. Slowly change the course selector to center the deviation. The system will automatically go from APR arm and HDG to APR coupled when the computed capture point is reached. The HDG annunciator will go out and the APR annunciator will cease flashing and remain on steady.

C. Set the course selector on the KI 525A to the lubber line and change the bearing selector to give full scale deflection. The control wheel should roll to the left. Change the bearing selector to give full scale right deflection, the control wheel should roll to the right.

11.2.4.5.1 (Continued)

D. With a full scale deflection displayed, rotate the course selector on the KI 525A counterclockwise. This will stop the control wheel. The course will be a 40 $\pm 7^{\circ}$ decreased heading from the lubber line. Set the test generator bearing selector for a full left deflection and rotate the course selector clockwise until the control wheel stops. The course will be a 40 $\pm 7^{\circ}$ increased heading from the lubber line.

11.2.4.5.2 THE FOLLOWING ARE APPROACH CHECKS FOR A KG 107 DIRECTIONAL GYRO

A. With the KG 258 level (or the Gyro Simulator set to zero), set the test generator to a VOR frequency and select the test frequency on the NAV receiver. Set the bearing selector on the test generator to the same bearing as the airplane heading and adjust the OBS knob on the NAV Indicator to give full scale deviation. Set the HDG SEL/CRS DAT bug on the lubber line. Engage the HDG mode and the APR mode. HDG should illuminate and the APR annunciator will flash, indicating approach arm. After a 5 second delay, the autopilot will command a roll in the direction of the indicated deviation. Adjust the HDG SEL/CRS DAT bug on the KG 107 to stop the control wheel's motion. The bug should indicate a 45 $\pm 5^{\circ}$ decrease from the lubber line.

B. Slowly reduce the bearing offset on the test generator to center the deviation. As the deviation indicator moves toward the center, the APR Annunciator will cease flashing and remain on indicating APR coupled. The autopilot will command a left roll. Center the bug under the lubber line. The autopilot will stop driving (may creep).

C. Slowly change the OBS knob to center the deviation. The system will automatically go from APR arm and HDG to APR coupled when the computed capture point is reached. The HDG annunciator will go out and the APR annunciator will cease flashing and remain on steady. The autopilot will cease driving (may creep).

D. Set the HDG SEL/CRS DAT bug on the KG 107 to the lubber line and change the bearing selector to give a full scale left deflection. The control wheel should roll to the left. Change the bearing selector to give full scale right deflection. The control wheel should roll to the right.

E. With a full scale right deflection displayed, rotate the bug on the KG 107 counterclockwise to stop the control wheel. The course will be a 40 $\pm 7^{\circ}$ decreased heading from the lubber line. Set the test generator bearing selector for a full scale left deflection and rotate the bug clockwise until the control wheel stops. The course will be 40 $\pm 7^{\circ}$ increased heading from the lubber line.

11.2.4.6 AUTOPILOT OVERPOWER CHECK

Engage the AP. Apply force to the control wheel to determine if the roll servo clutch can be overpowered.

11.2.4.7 AUTOPILOT DISCONNECT CHECKS

The following conditions should disengage the autopilot modes:

A. Pulling the AUTOPILOT circuit breaker to the off position. (Pre-flight test must be initiated and passed before the autopilot can be re-engaged).

B. Pressing the pilot's AP DISC/TRIM INTER switch will disconnect the AP (airplanes equipped w/ Manual Electric Trim, only).

C. Excessive roll rate.

D. If the HDG Flag comes into view when any mode is on that uses heading information (disengages AP an all lateral modes).

11.2.5 IN-FLIGHT CHECKS AND ADJUSTMENTS

This checkout should be run on all new installations and any time there has been a major system rework or airplane wiring change.

THE AUTOPILOT MUST BE OPERATED IN ACCORDANCE WITH THE APPROVED FLIGHT MANUAL SUPPLEMENT.

11.2.5.1 PRE-FLIGHT CHECKOUT

Prior to takeoff, perform the pre-flight checkout as outlined in the appropriate Airplane Flight Manual Supplement.

11.2.5.2 IN-FLIGHT CHECKS

A. GYRO ZEROING ADJUSTMENT

With the airplane in cruise flight condition, disconnect the Autopilot. Hand fly the airplane and observe the KG 258 Horizon Indicator with the wings level. Due to gyro manufacturing tolerances, and the possibility of a misaligned instrument mounting, some small bank angle may be displayed. A releveling of the KG 258 in the panel should be considered if the angle displayed with the wings level is more than two degrees.

B. BASIC AP

At a safe altitude, and with the airplane trimmed for straight and level flight, engage the AP mode. The autopilot should hold the airplane at zero roll attitude as indicated on the KG 258 roll display. If the airplane does not maintain zero roll attitude, an adjustment of the KC 190 R286 roll adjust pot (RN) is required. Adjust the control as necessary for a zero roll indication. Adjustment should be made slowly to avoid overcompensation.

Overpower the roll servo clutch and manually change the heading attitude. Release control back to the autopilot and the airplane should return to wings level.

C. HDG SEL CHECKS (Cruise Configuration)

Set the HDG bug on the KPI 525 or the HDG SEL/CRS DAT bug on the KG 107 to a 90 degree increase in heading and engage the HDG mode. The autopilot will bank the airplane up to $20^{\circ} \pm 3^{\circ}$ right bank. The airplane will roll out on the selected heading with no overshooting. Repeat the test using a 90° decrease in selected heading. (If the system flies with a HDG bug offset of 3° or more, airplane trim should be checked closely as well as the KG 258 Gyro installation in the airplane panel for proper leveling.)

11.2.5.3 THE FOLLOWING ARE NAVIGATION CHECKS FOR KCS 55A COMPASS SYSTEM. REFER TO 11.2.5.4 FOR KG 107 DIRECTIONAL GYRO

A. NAV CHECKS

Select an omni station at approximately twenty miles distance and set in the desired course on the Pictorial Navigation Indicator. Select the course by turning the course pointer until the KI 525A deviation indicator is centered in the "TO" position. Then increase or decrease the course selected by ten degrees.

11.2.5.3 (Continued)

Engage the AP and HDG modes and set up an intercept angle of twenty to sixty degrees using the HDG SEL bug. Arm the NAV mode by pressing the NAV switch. The system will fly on HDG until the proper intercept point is reached, where it will automatically switch from HDG, NAV Arm (flashing) to NAV coupled (steady). When NAV coupled is achieved, the system will bank the airplane up to the necessary bank angle to execute the turn on to the radial with minimum overshoot. Allow the system to track the radial for five minutes. The system will command the airplane to fly along the radial with no large steering maneuvers.

NOTE

IF THE CDI DEVIATION IS LESS THAN THREE DOTS AND THE BANK ANGLE IS LESS THAN FOUR DEGREES, THE SYSTEM WILL GO TO COUPLED AFTER 2 SECONDS IN ARM.

B. APR (ILS) CHECKS

While approaching the station in the HDG mode, tune in the LOC receiver and set the course pointer to the published runway inbound heading. Set up an intercept angle of greater than 90° to the inbound course. Arm the APR mode and engage the BC switch in advance of beam interception. The BC Annunciator will illuminate and APR will flash. The system will capture and track the localizer outbound. (Some overshoot may occur if the angle is too sharp or if the capture is made extremely close in.) While on the localizer outbound, descend to the desired altitude.

Set the HDG bug to the procedure-turn heading and press the HDG switch. The airplane will turn to the procedure-turn outbound heading. Use the HDG mode to complete the procedure-turn. When the airplane is within 90° of the inbound course, press the APR switch. With the APR mode armed (flashing), set up a 45° intercept angle using the HDG mode.

When the proper intercept is reached, the system will automatically transfer from HDG, APR arm to APR coupled (annunciator on steady) and turn onto the inbound localizer.

Establish the airplane in the approach configuration. When desired, disconnect the autopilot by use of the AP DISC/TRIM INTER switch.

C. APR (VOR) CHECKS

Using the published VOR approach information, set the course selector on the Pictorial Navigation Indicator to the inbound course. Use the HDG mode to set up a forty-five degree intercept of the VOR radial. Arm the approach mode by pressing the APR switch while the deviation is still full scale. When the proper intercept point is reached, the system will go from HDG, APR Arm (flashing) to APR coupled (steady). When desired, execute a missed approach procedure or disengage the autopilot and execute a landing.

11.2.5.4 KG 107 DIRECTIONAL GYRO NAVIGATION CHECKS

A. NAV CHECKS

Select an omni station at approximately twenty miles distance and set in the desired course by turning the OBS knob until the NAV Indicator deviation is centered in the "TO" position. Then increase or decrease the course selected by ten degrees.

11.2.5.4 (Continued)

Engage the HDG mode and set up an intercept angle of 90° using the HDG SEL/CRS DAT bug. Arm the NAV mode by pressing the NAV switch on the KC 190 Computer and turning the HDG SEL/CRS DAT bug to the radial selected on the NAV Indicator. The NAV Annunciator will flash to indicate NAV arm mode and after a 5 second delay the airplane will turn to make a 45° intercept of the radial selected. As the airplane approaches the radial it will automatically switch from HDG, NAV arm to NAV coupled. When NAV coupled is achieved, the NAV Indicator will cease flashing and remain on, the autopilot will bank the airplane up to the necessary bank angle to execute the turn on to the radial with minimum overshoot. Allow the autopilot to track the radial for five minutes. The autopilot will command the airplane to fly along the radial with no large steering maneuvers.

NOTE

IF THE CDI DEVIATION IS LESS THAN THREE DOTS AND THE BANK ANGLE IS LESS THAN FOUR DEGREES, THE SYSTEM WILL GO TO CPLD AFTER 2 SECONDS IN ARM.

B. APR (ILS) CHECKS

While approaching the station in the HDG mode, tune in the LOC receiver and set the OBS knob to the published runway inbound heading. Set up an intercept angle of greater than 90° to the inbound course. Engage the BC switch and turn bug on the KG 107 to the localizer inbound course. The BC annunciator will illuminate and the APR annunciator will flash to indicate APR arm mode. After a five second delay the airplane will turn to make a 45° intercept of the localizer outbound course. The autopilot will capture and track the localizer outbound. While on the localizer outbound, descend to the desired altitude.

Set the HDG SEL/CRS DAT bug to the procedure-turn heading and press the HDG switch on the KC 190. The airplane will turn to the procedure-turn outbound heading. Use the HDG mode to compelte the procedure-turn. When the airplane is within 90° of the inbound course, press the APR switch on the KC 190 and turn the bug to the localizer inbound course. The autopilot will set up a 45° intercept angle automatically. When the proper intercept is reached, the autopilot will switch from HDG, APR arm (flashing) to APR coupled (steady) and turn onto the inbound localizer.

Establish the airplane in the approach configuration. When desired, disconnect the autopilot by use of the AP switch on the KC 190.

C. APR (VOR) CHECKS

Using the published VOR approach information, set the OBS knob on the NAV Indicator to the inbound course. Arm the APR mode by pressing the APR switch on the KC 190 while the deviation is still full scale and turn the HDG SEL/CRS DAT bug to the inbound course. The APR annunciator will flash to indicate APR arm mode. After a five second delay the airplane will turn to make a 45° intercept of the inbound radial. When the proper intercept point is reached, the autopilot will go from APR arm (flashing) to APR coupled (steady). When desired, execute missed approach procedure or disengage the autopilot and execute a landing.

THIS CONCLUDES THE NORMAL INSTALLATION FLIGHT CHECKS OF THE KAP 100 AUTOPILOT SYSTEM WITH KCS 55A OR KG 107 AND WITH OR WITHOUT MANUAL ELECTRIC TRIM.

11.3 CHECKOUT PROCEDURE FOR OPTIONAL KAS 297B VERTICAL SPEED AND ALTITUDE SELECTOR (KAP 150 AND KFC 150 FLIGHT CONTROL SYSTEMS ONLY).

11.3.1 KAS 297B UNIT ALIGNMENT

Alignment of the KAS 297B is not mandatory, but is recommended in order to provide optimum performance and accuracy.

In order to perform the KAS 297B Unit Alignment, a static pressure system tester must be connected to the airplane pitot-static system. An altitude range of 0 to 30,000 feet will be required. Apply power to the KAP/KFC 150 System, KAS 297B, and KEA 130A Encoding Altimeter; it is not necessary to remove the KAS 297B from the panel to conduct the alignment procedure.

A. Calibrate Procedure Background

The KAS 297B can be calibrated at 7 points; 0, 5,000, 10,000, 15,000, 20,000, 25,000, and 30,000 feet. Since the KAS 297B incorporates a proximity detector, any one, two, or all of the points may be used, and may be updated in any sequence. Therefore, if operation at the 15,000 foot altitude only is not satisfactory, simply enter the calibrate mode and correct this single point. To enter the calibrate routine, press and hold both the VS ENG and ALT ARM buttons. After 5 seconds the VS and ALT annunciators will go out and the CAPT Annunciator will come on; release the buttons. At this time, the unit will display an uncorrected barometric altitude close to what is indicated on the KEA 130A Altimeter. When a calibrate point is entered by pressing the VS ENG button, the display will momentarily indicate the calibrate altitude. Example: The KEA 130A indicates 10,000 feet, the KAS 297B display reads 9,910 feet. Press the VS ENG button, the display will momentarily indicate 10,000 feet. Release the button and the 90 foot error difference is now stored for operational use. Errors of greater than 150 feet can not be corrected. To exit the calibrate mode first press the ALT ARM button, then press the VS ENG button and release both. The unit will now resume normal operation.

B. Momentarily press the self test switch on the KC 191/192 flight computer. For the duration of the self test all modes and annunciators will illuminate on the KAS 297B; the unit will also display 88,800.

C. Move the inner concentric knob on the KAS 297B to the "in" position; this will select the altitude preselect mode, and the unit will display the altitude desired as adjusted by the increment/decrement knots.

D. Set the baro select on the KEA 130A Encoding Altimeter precisely to 29.92 inches Hg. Reduce the static pressure source unit the altimeter reads 500 feet below sea level.

E. Simultaneously press and hold the VS ENG and ALT ARM switches on the KAS 297B faceplate. After approximately 5 seconds the VS and ALT Annunciators will go out and the CAPT Annunciator will illuminate. This indicates the unit is now in the calibrate mode and ready for the alignment sequence. Release the switches.

F. Using the static pressure source, increase the altitude to 0 feet as indicated on the KEA 130A. When stable and holding at 0 feet press the VS ENG button momentarily. The CAPT Annunciator will go out, then come back on as the button is released. This indicates the KAS 297B has stored the first alignment point.

G. Continue increasing the altitude, and when stable at each alignment point (5,000, 10,000, 15,000, 20,000, 25,000 and 30,000 feet) press the VS ENG button.

11.3.1 (Cont'd)

H. After the final desired calibrate altitude has been entered, exit the mode by pressing and holding the ALT ARM button, then momentarily pressing the VS ENG button (both buttons depressed at the same time). Release, and the unit is now ready for normal operation.

I. The static pressure system tester may now be disconnected from the airplane. This ends the KAS 297B alignment procedure.

11.3.2 KAS 297B OPERATIONAL CHECKS

11.3.2.1 Connect a static-pressure system tester to the airplane; an altitude range of 0 to 30,000 feet will be required. The KAS 297B will not need to be removed from the panel. Apply power to the flight control System, KAS 297B, and KEA 130A encoding altimeter.

11.3.2.2 To check for proper KAS 297B operation when approaching the selected altitude from below:

A. Adjust the baro set on the KEA 130A Altimeter to 29.92 inches. With all KFC 150 System modes disengage, select an altitude on the KAS 297B at least 1100 feet above the altitude indicated on the KEA 130A Altimeter.

B. Engage the ALT "ARM" mode by pressing the arm switch on the KAS 297B (Note: the KAS 297B MUST be displaying the selected altitude before the arm mode is able to be engaged). The "ARM" annunciator in the KAS 297B and "FD" annunciator on the KC 192 Flight Computer should illuminate and the command bars on the KI 256 Flight Command Indicator should come into view.

C. Slowly adjust the static system tester to increase the Altimeter Altitude. At 1000 $\pm$ 50 feet below the selected altitude, the "ALERT" Annunciator in the KAS 297B will light and an audio warning sound. Continue increasing the altitude and at 300 $\pm$ 50 feet below the selected altitude the alert light will extinguish. At the selected altitude, $\pm$ 50 feet, the "ALERT" light in the KAS 297B will flash and the aural alert will sound for approximately 2 seconds, and the KC 192 will annunciate the "ALT" Mode. In addition, the "ARM" annunciator in the KAS 297B will go out. Continue to increase the Altitude and note the point when the Altitude Selector "ALERT" light again illuminates. This will occur at 300 $\pm$ 50 feet above the selected altitude and the "ALERT" light shall flash and a 2 second aural tone sound. Continue to increase the altimeter until the flashing ALERT annunciator extinguishes. This will occur at 1000 $\pm$ 50 feet above the selected altitude.

11.3.2.3 To check for proper KAS 297B Altitude Select operation when approaching the selected altitude from above perform the steps outlined in section 11.3.2.2.C above, selecting an altitude lower than the starting altitude. All warnings and annunciations should operate as in step 11.3.2.2.C however, they will occur before reaching the selected altitude and after continuing on 300 and 1000 feet past the selected altitude.

NOTE

REPEAT THE CHECK OF ALTITUDE SELECT OPERATION, BOTH CLIMBING AND DESCENDING, AT A VARIETY OF ALTITUDES THROUGHOUT THE ALTITUDE RANGE OF THE AIRPLANE. IF ACCURACIES LESS THAN THOSE LISTED RESULT, THE TWO CALIBRATE POINTS NEAREST THE PROBLEM AREA SHOULD BE UPDATED, AS PER THE CALIBRATE ROUTINE SECTION 11.3.1.

THIS CONCLUDES THE GROUND CHECKOUT OF THE KAS 297B ALTITUDE/VERTICAL SPEED SELECTOR OPTION.

11.3.3 IN-FLIGHT CHECKS

11.3.3.1 ALT ARM

Establish the airplane in straight and level flight in the FD and HDG Mode with AP engaged. Select an altitude at least 2000 feet higher on the KAS 297B Altitude/Vertical Speed Selector and using the vertical trim switch on the KC 192 Flight Computer start a climb toward the selected Altitude. Use an appropriate pitch attitude and power setting to maintain a safe climb speed. Engage the ALT ARM Mode and ARM will annunciate on the KAS 297B. At 1000 ± 100 feet below the selected altitude, the ALERT Annunciator on the KAS 297B will illuminate and an Audio warning sound. At 300 ± 100 feet below the selected altitude, the ALERT Annunciator will extinguish, indicating entry into the "SAFE" band. The airplane will begin to smoothly round out to a level flight attitude 200 to 500 feet below the selected altitude, depending upon rate of climb. At the selected altitude ± 100 feet, the ALT ARM Mode will disengage and the system will transfer to the Altitude Hold (ALT) Mode, as indicated on the KC 192. Repeat this procedure for a selected altitude at least 2000 feet below present altitude. Maintain an appropriate descent rate and observe the ALERT annunciate 1000 ± 100 feet above the selected altitude and the airplane will capture the desired altitude and transfer to Altitude Hold (ALT) Mode within 100 feet of the selected altitude.

11.3.3.2 VERTICAL SPEED MODE

A. Establish the airplane in straight and level Flight in the FD and HDG modes with AP engaged. With the KAS 297B displaying vertical speed, select ± 500 feet per minute on the unit and engage vertical speed hold by pressing the VS ENG button. The autopilot will smoothly fly to the climb or descent rate and hold within ± 100 feet per minute. Rotate the VS select controls to select a new rate and note that the autopilot will smoothly fly to and track the selected Vertical Speed.

B. With FD, HDG and AP modes selected, engage the VS mode. With the KAS 297B displaying selected altitude on the KAS 297B operation of the CWS switch on the pilot's control wheel will cause the KAS 297B to temporarily revert back to the vertical speed display, and track and display the present vertical speed. The system will lock on to the vertical speed present when the switch is released and track within ± 100 feet per minute.

NOTE

DURING TURNING FLIGHT THE VS MODE MAY BE EXPECTED TO INITIALLY VARY BY AS MUCH AS 350 FEET PER MINUTE DUE TO CHANGING AIRPLANE LIFT REQUIREMENTS. HOWEVER, VS MODE TRACKING SHOULD STABILIZE ONCE THE BANK ANGLE IS ACHIEVED AND THE TURN RATE IS STABLE.

12.0 APPENDIX

The following pages show specific unit installation drawings of units used in this installation.

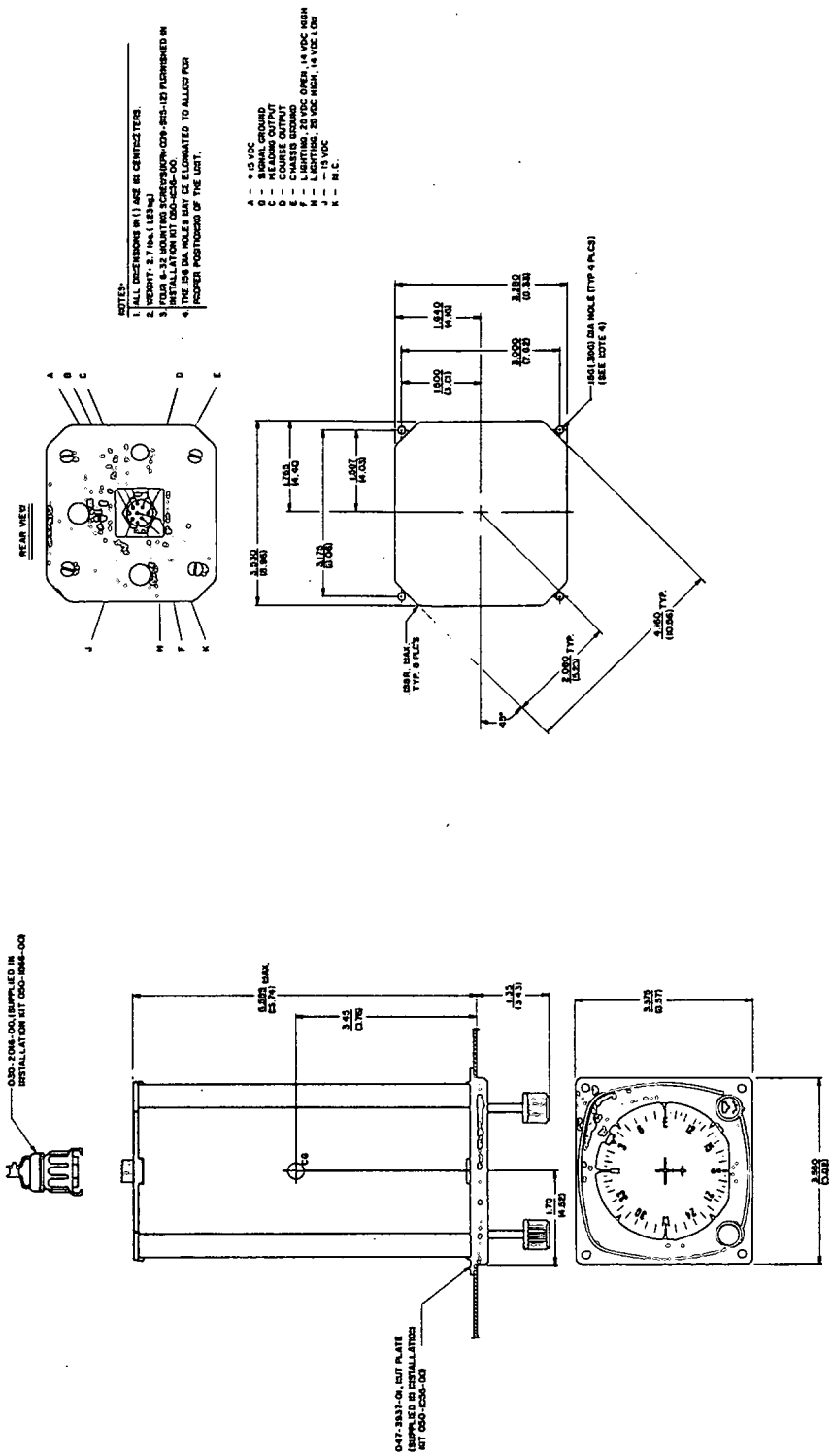
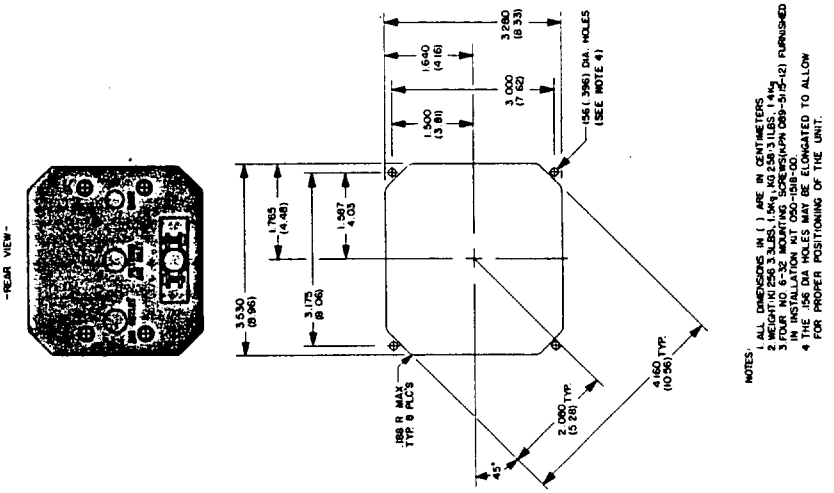
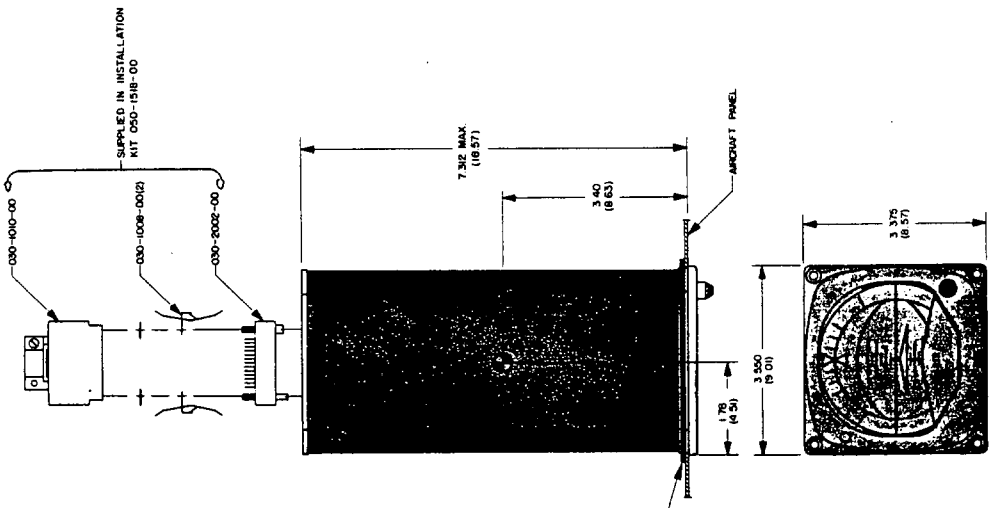


FIGURE 12-A KG 107 INSTALLATION DRAWING





UNIT	KING PART NO.	DESCRIPTION
KI 256	060-0017-00	FCI, 0° PANEL, SCR. ADJ.
KI 256	060-0017-01	FCI, 8° PANEL, SCR. ADJ.
KG 258	060-0020-01	HDR, 0° W/PO. KNOB ADJ.
KG 258	060-0020-02	HDR, 8° W/PO. KNOB ADJ.
KG 256	060-0020-03	HDR, 0° W/ROLL PO. KNOB ADJ.
KG 256	060-0020-04	HDR, 8° W/ROLL PO. KNOB ADJ.
KG 256	060-0020-05	HDR, 0° W/O PO. KNOB ADJ.
KG 256	060-0020-06	HDR, 8° W/O PO. KNOB ADJ.
KG 256	060-0020-07	HDR, 0° W/PO. SCR. ADJ.
KG 256	060-0020-08	HDR, 8° W/PO. SCR. ADJ.
KG 256	060-0020-09	HDR, 0° W/ROLL PO. SCR. ADJ.
KG 256	060-0020-10	HDR, 8° W/ROLL PO. SCR. ADJ.
KG 256	060-0020-11	HDR, 0° W/O PO. SCR. ADJ.
KG 256	060-0020-12	HDR, 8° W/O PO. SCR. ADJ.

FIGURE 12-B KG 258/KI 256 INSTALLATION DRAWING

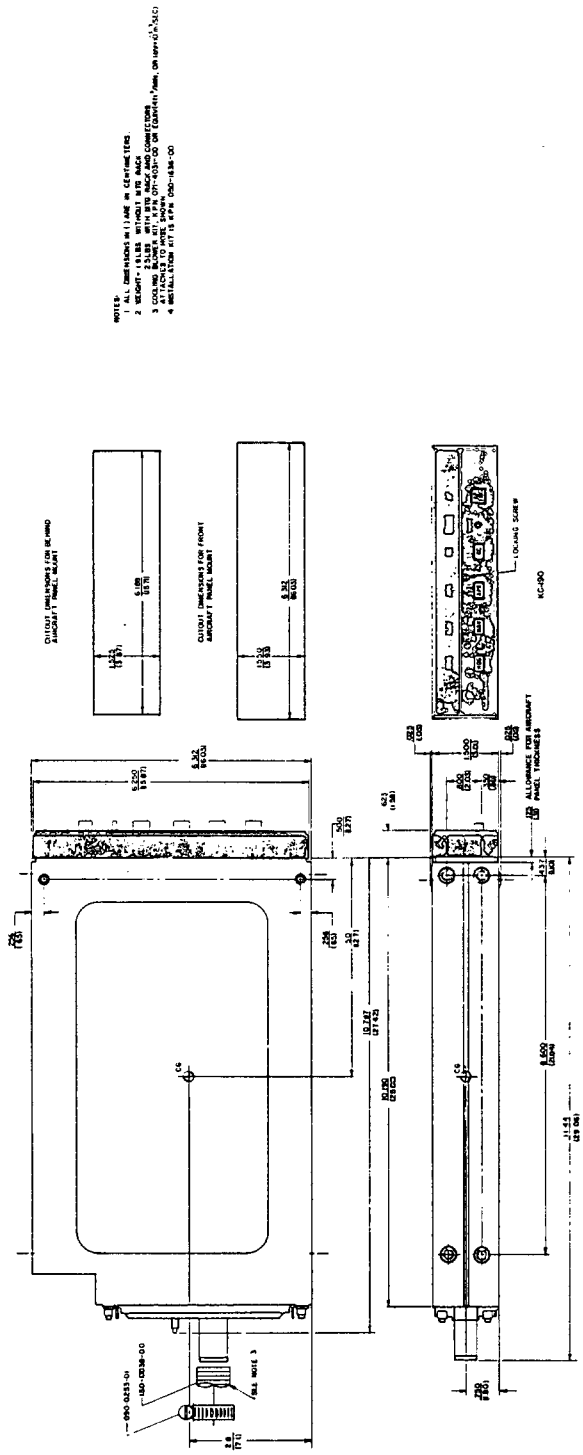
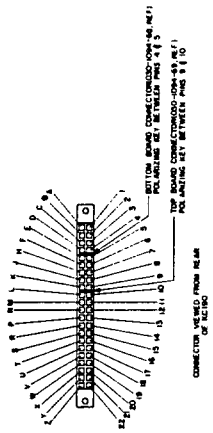


FIGURE 12-C KC 190 INSTALLATION DRAWING
(Sheet 1 of 2)



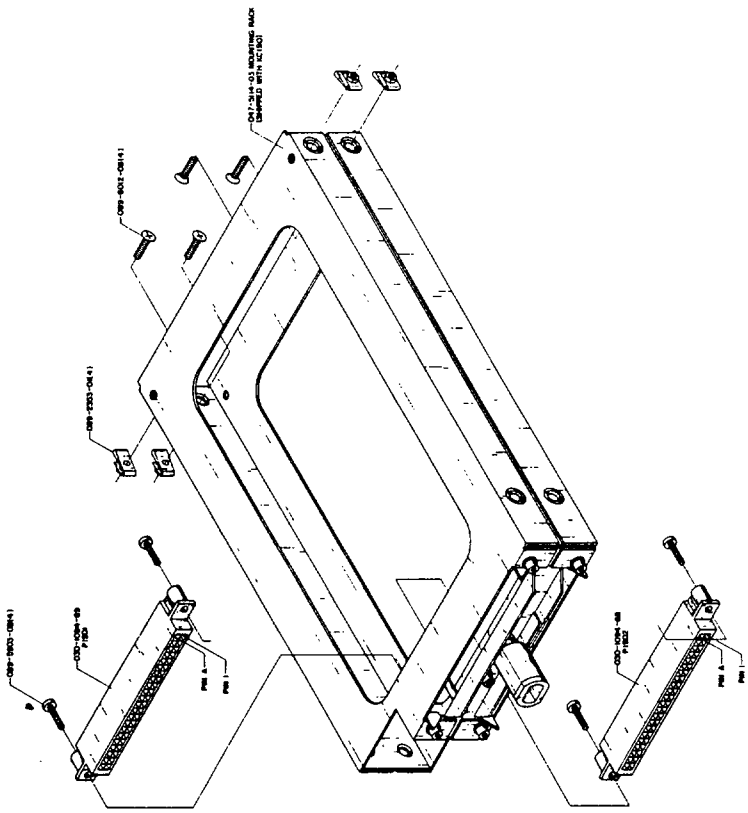


FIGURE 12-D KC 190 INSTALLATION DRAWING
(Sheet 2 of 2)

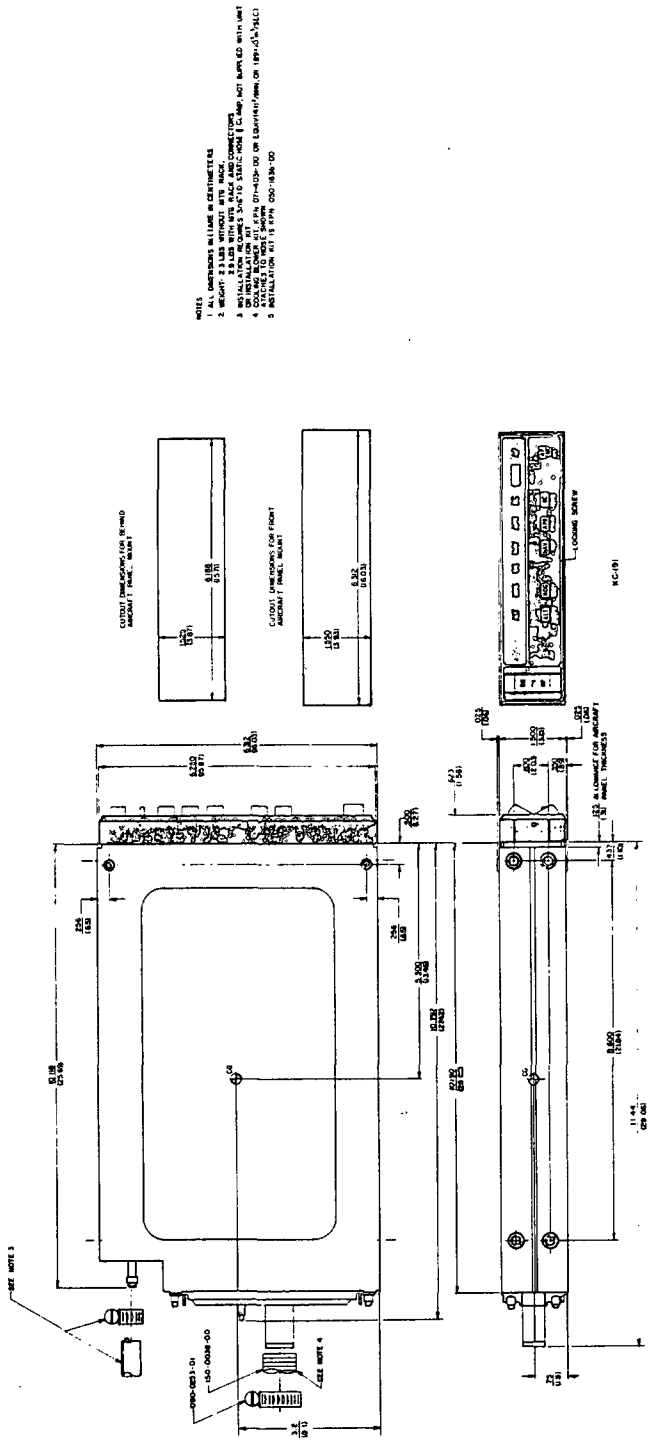
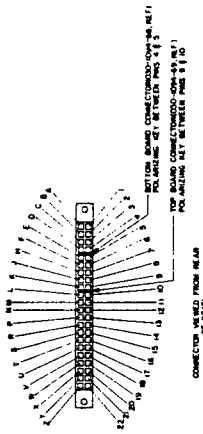


FIGURE 12-E KC 191 INSTALLATION DRAWING
(Sheet 1 of 2)



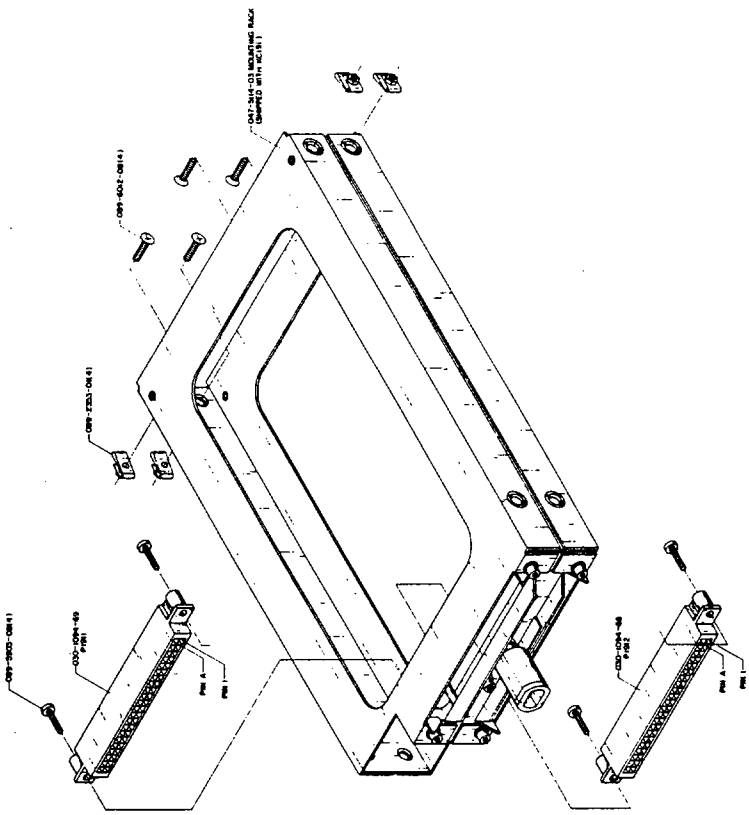


FIGURE 12-F KC 191 INSTALLATION DRAWING
(Sheet 2 of 2)

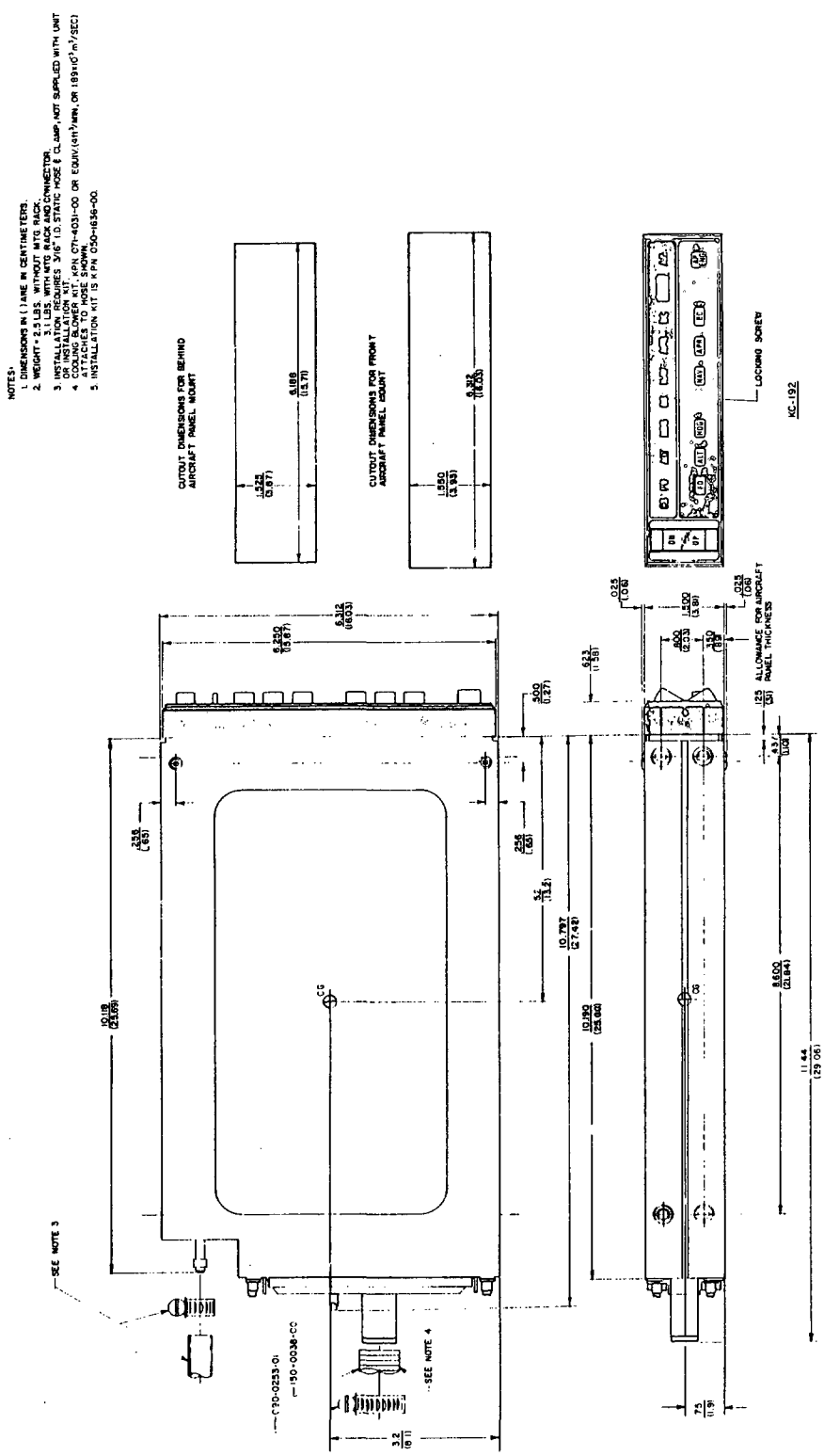
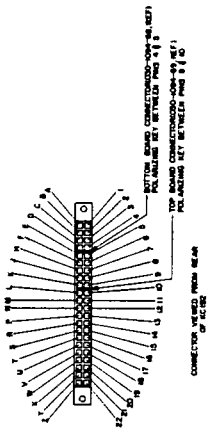


FIGURE 12-G KC 192 INSTALLATION DRAWING
(Sheet 1 of 2)



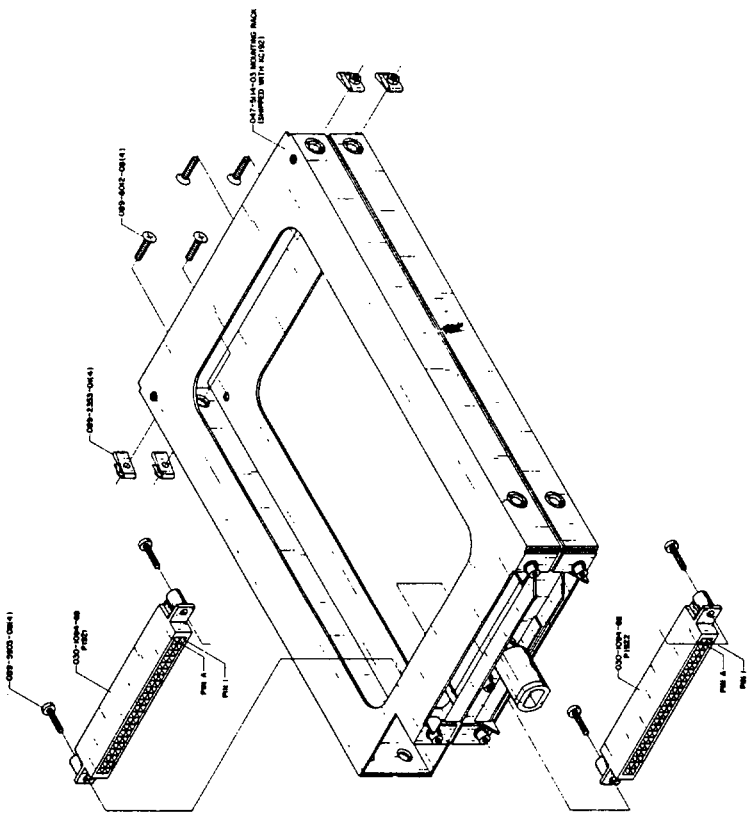


FIGURE 12-H KC 192 INSTALLATION DRAWING
(Sheet 2 of 2)

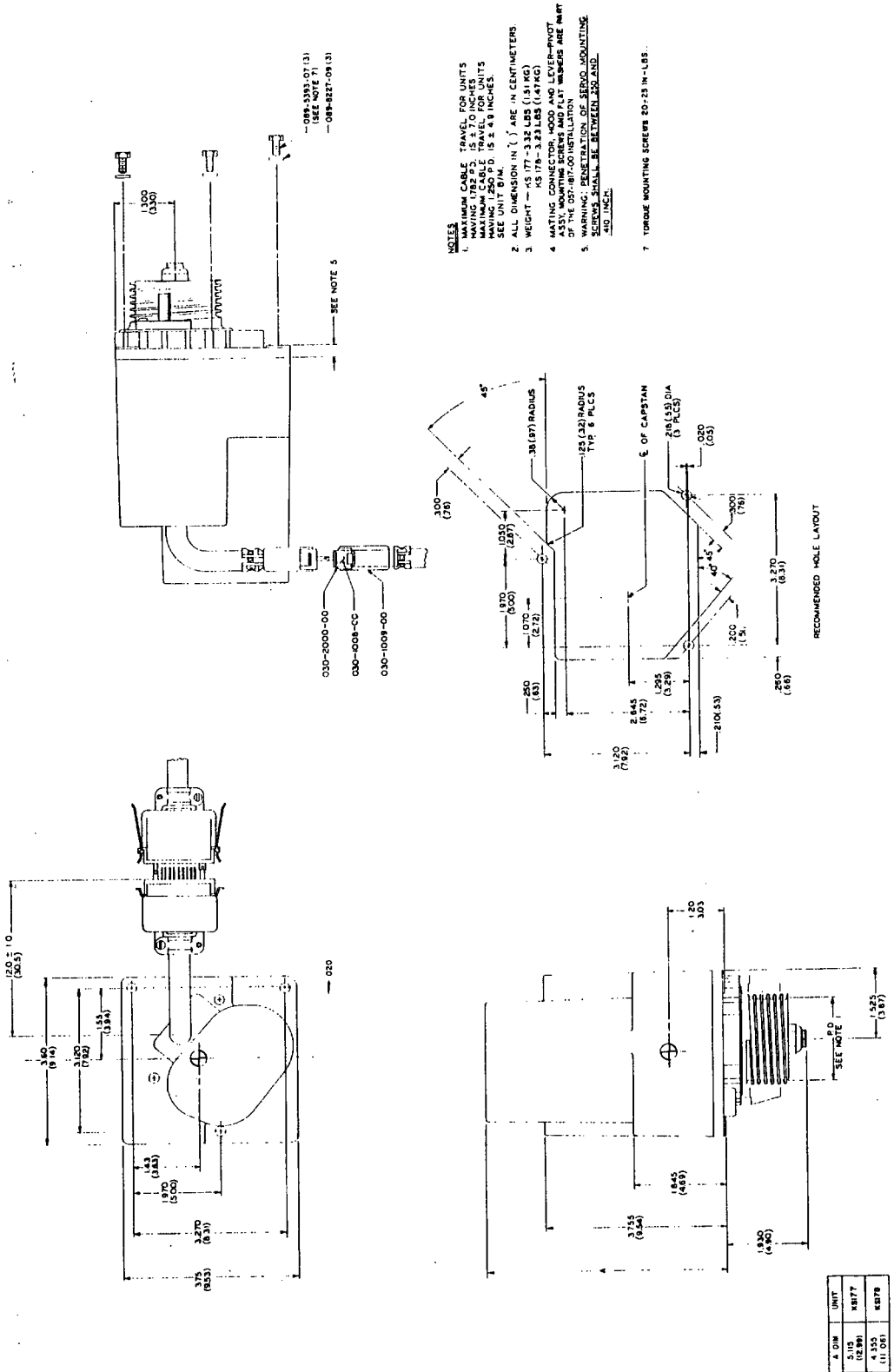


FIGURE 12-I KS 177/KS 178 INSTALLATION DRAWING

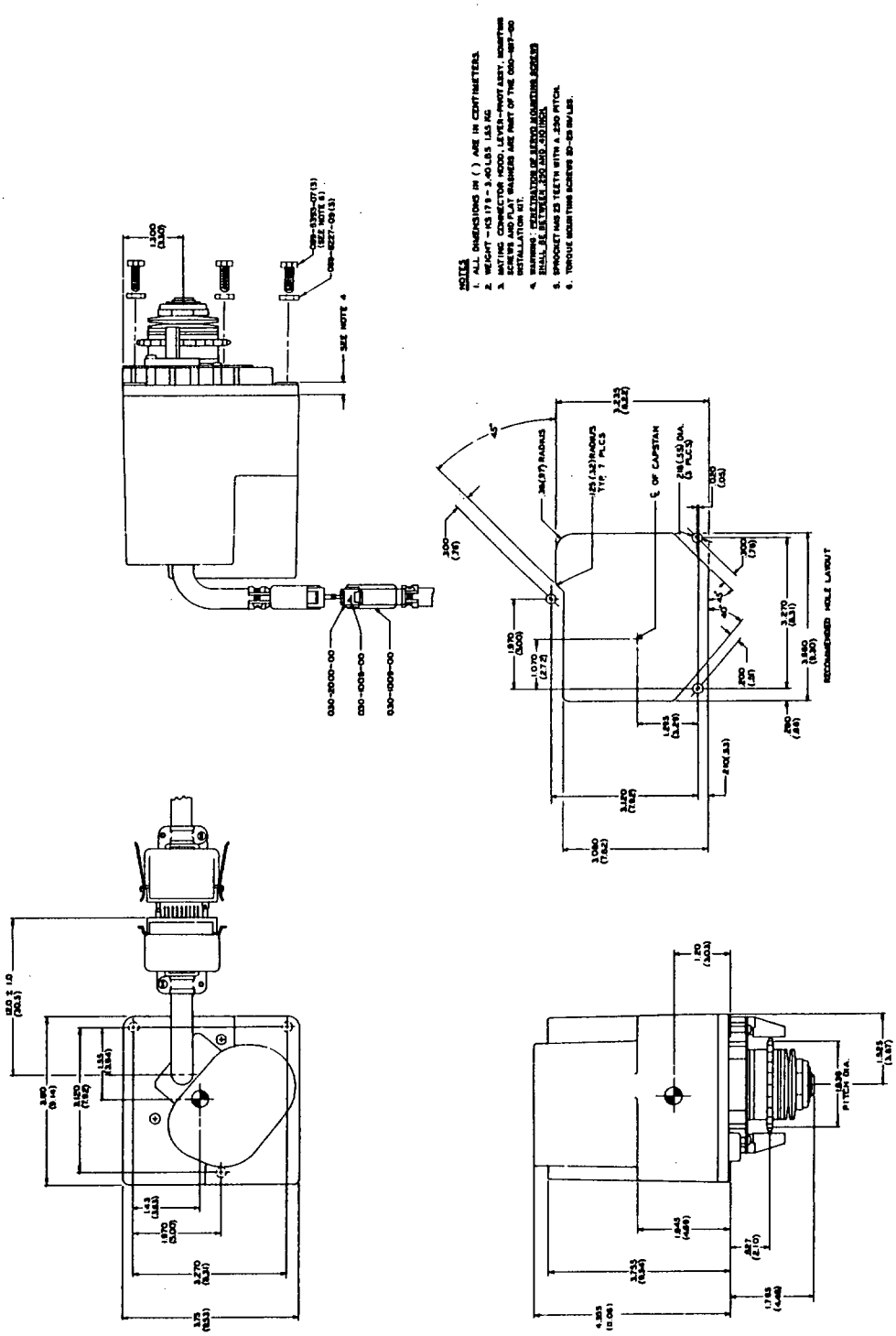


FIGURE 12-J KS 179 INSTALLATION DRAWING

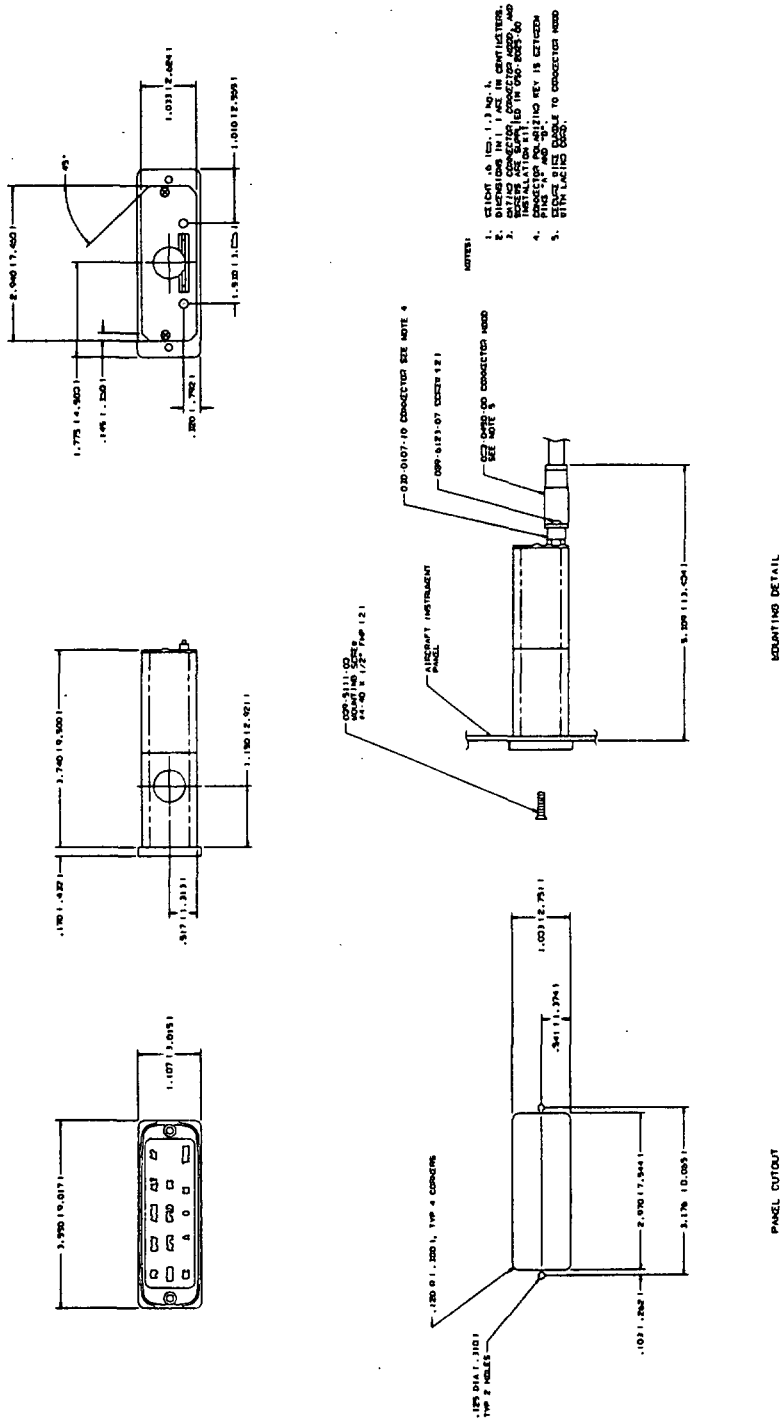


FIGURE 12-K KA 185 INSTALLATION DRAWING

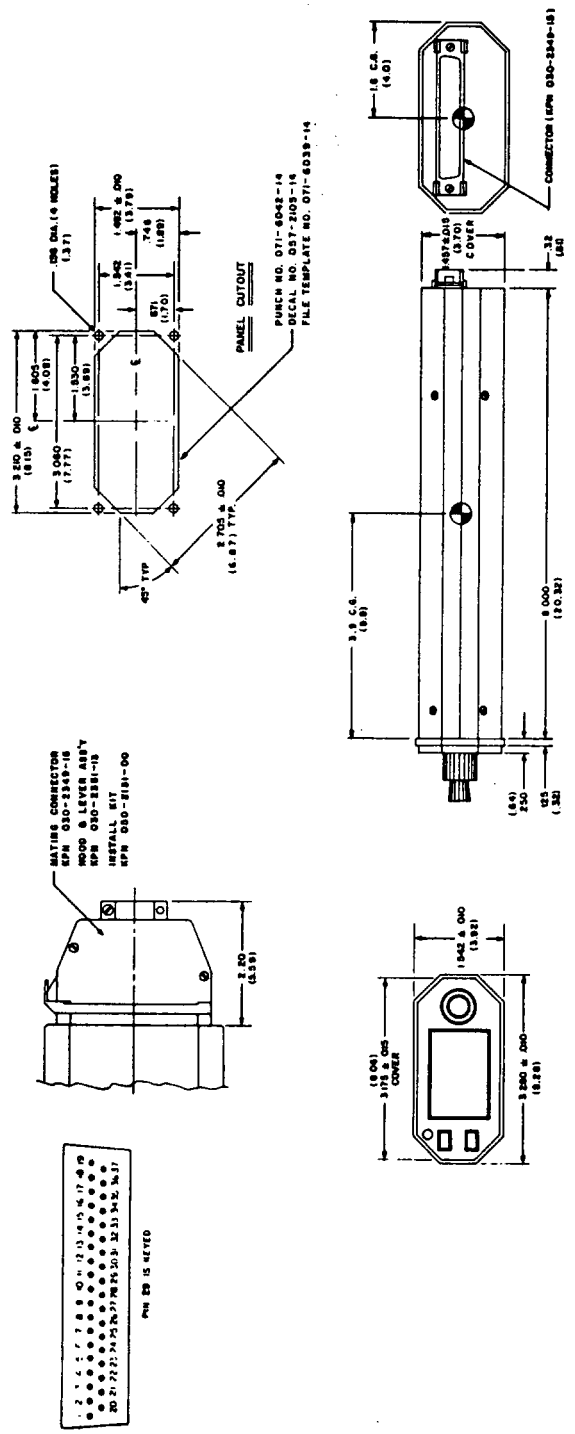


FIGURE 12-L KAS 297B INSTALLATION DRAWING

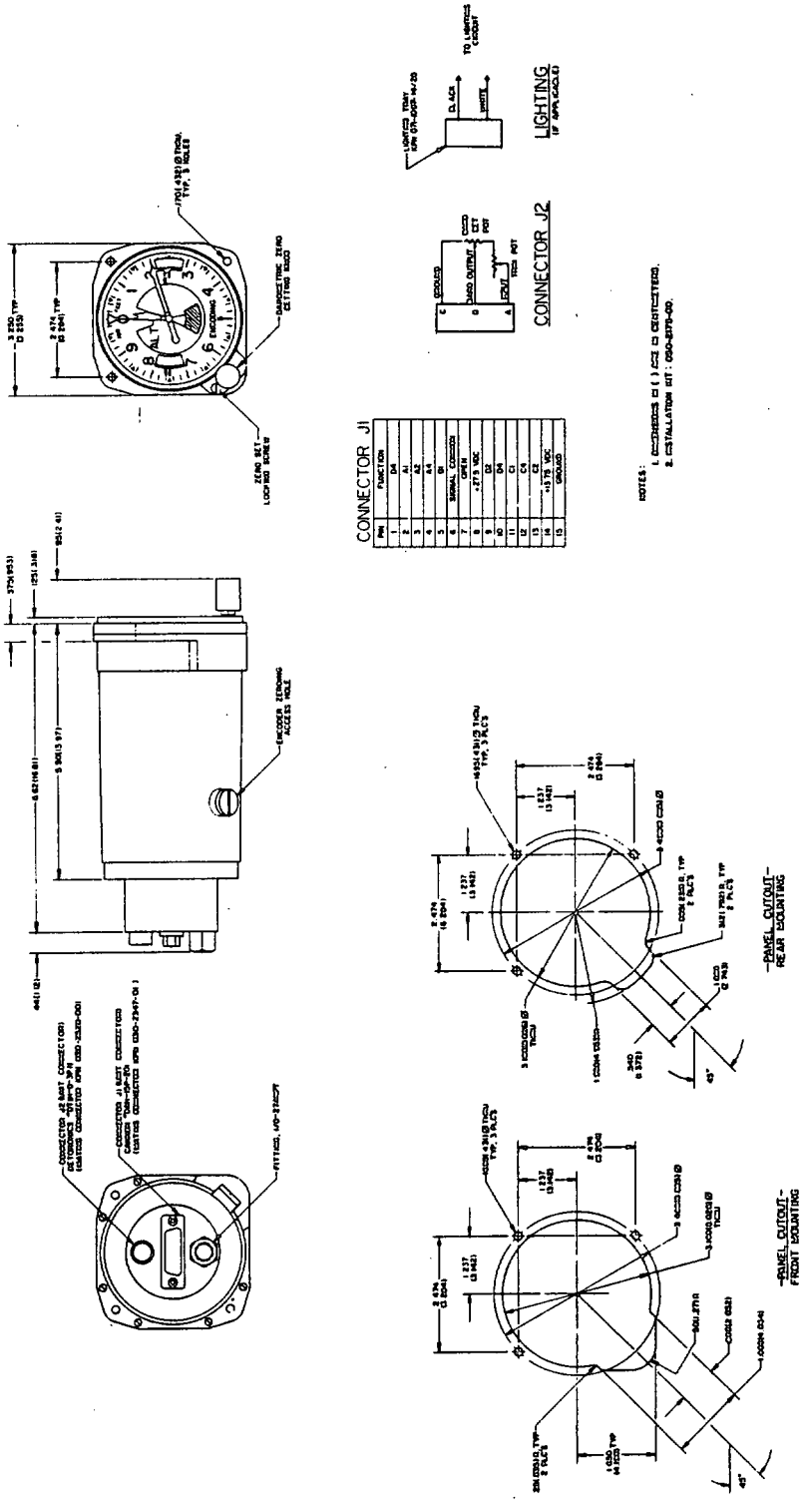


FIGURE 12-M KEA 130A INSTALLATION DRAWING