

BASIC DIGITAL FLIGHT INSTRUMENT, KIT INSTRUCTIONS FOR CONTINUING AIRWORTHINESS

MODELS: BELL 205A-1

Read all of the Instructions for Continuing Airworthiness
thoroughly prior to performing any activities relating to this product

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Notes

1. If changes to this document are required, Alpine Aerotech LP shall revise all pages and reissue the entire document.
2. Alpine Aerotech LP shall publish any subsequent revisions of this document to be made freely available. Alpine Aerotech LP also recommends that the end user of this product periodically verify the revision level of this document.

SECTION 1 Introduction

This document comprises Instructions for Continuing Airworthiness that apply to AAL Basic Digital Flight Instrument, Kit installed on Bell 205A-1 rotorcraft. The information and data contained in this document are supplemental to the information contained in the existing ICA for the Bell 205A-1.

Applicability

The Basic Digital Flight Instrument, Kit (AAL-280-070-001) is applicable to all serial numbers of Bell 205A-1 rotorcraft.

SECTION 2 DESCRIPTION

The following information provides a functional description of the Basic Digital flight Instrument, Kit as defined in Alpine Aerotech LP authority dataset AAL-280-070-001.

The AAL Basic Digital Flight Instrument, Kit allows for the replacement of the OEM attitude and heading instruments with standalone digital instruments. The kit includes instrumentation for both the pilot and co-pilot sides.

SECTION 3 OPERATION

Refer to the following Kelly Manufacturing Company Installation/Operation Guide for operation information:

Description	Pub. Number	Rev. (or later)
RCA 1510 Electric Digital Heading Indicator	1401-5	H*
RCA 2610 Electric Digital Horizon	1401-3	D*

*Contact Kelly Manufacturing Company to obtain correct publication revision.

SECTION 4 MAINTENANCE INSTRUCTIONS

General Notes

1. The following information defines the instructions for continuing airworthiness, repair allowances and airworthiness limitations for the item(s) referenced within this document.
2. Refer to the current revision of the BHT Maintenance Manual, BHT-205A-1-MM, for the chapter(s) and section(s) referenced within this document.
3. Refer to the Section 6: Removal/Replacement and Section 9: Illustrated Parts Breakdown for the replacement and/or installation of the item(s) referenced within this section.
4. Scheduled inspection for the item(s) referenced within this document shall be accomplished in accordance with (IAW) the Inspection Procedures specified.
5. Repair allowances for the item(s) referenced within this document shall be accomplished IAW Section 5, Troubleshooting.
6. Limitations for the item(s) referenced within this document are IAW Section 8, Airworthiness Limitations.
7. Record instrument serial numbers in the table provided below for future reference.

Pilot (RHS) Attitude S/N		Co-pilot (LHS) Attitude S/N	
Pilot (RHS) Heading S/N		Co-pilot (LHS) Heading S/N	

Inspection Procedures

Supplement to applicable Maintenance Manual, Chapter 5, Inspection and Component Overhaul Schedule

Notes

1. Refer to the applicable Maintenance Manual, Chapter 5, for general information on inspections, inspection definitions, inspection intervals, inspection interval tolerances, inspection methods and inspection schedules.
2. General Inspections, as indicated within this document, are defined as visual, non-thorough checks.
3. Detailed Inspections, as indicated within this document, are defined as visual and thorough, searching checks.
4. Perform 300 Hour/12 Month Inspections every 300 hours or every 12 months, whichever occurs first, prior to flight operation. If damage is detected, refer to the Repair Procedures section within this document.
5. Perform 24 Month Inspections every 24 months regardless of accumulated flight hours. The approved tolerance for the 24 Month Inspection is a maximum of six months beyond the specified interval.

Scheduled Inspections

1. 300 Hour/12 Month Inspections

Data Reference: Section 6: Removal/Replacement
Section 9: Illustrated Parts Breakdown

- i. Perform a Detailed Inspection on all materials and finishes in the Basic Digital Flight Instrument, Kit for evidence of corrosion and damage.
- ii. Perform a Detailed Inspection on all wiring harnesses, antennas and electrical components in the Basic Digital Flight Instrument, Kit for evidence of corroded contacts, chafing or any other type of mechanical damage and or wear.
- iii. Perform a Detailed Inspection on all items, materials and finishes in the Basic Digital Flight Instrument, Kit for proper integrity and condition.
- iv. Perform a Detailed Inspection on all hardware and fasteners in the Basic Digital Flight Instrument, Kit for proper security and torque.

CAUTION

Use extreme care when handling the instruments and avoid touching the screen if at all possible. For proper care and handling refer to Kelly Manufacturing publication No. 1401-5 for the Heading Indicator and No. 1401-3 for the Attitude Indicator.

2. 24 Month Inspections (regardless of hours)

Data Reference: Section 6: Removal/Replacement
Section 9: Illustrated Parts Breakdown

- i. Contact the instrument manufacturer with the serial numbers of the heading indicators and confirm that the World Magnetic Model (WMM) saved in your instrument(s) is the most current version. If it is not current, the manufacturer will give instruction on how to update the instrument. If it is determined that the WMM is not the most current version, an update must be performed within 90 days.

Conditional Inspections

1. Battery Condition Inspection

Data Reference: Section 6: Removal/Replacement
Section 9: Illustrated Parts Breakdown

If the “CHK Batt” warning appears on the screen of the Attitude Indicator it likely signifies a problem with the back-up battery capacity. Perform the following conditional inspection procedure.

- i. While on the ground, apply power to the instrument until the Battery Charge Status icon reads 100% (minimum 3 minutes).
- ii. Adjust “DIM” buttons so that the instrument is set to maximum brightness.
- iii. Cut the power to the instrument using the circuit breaker in the overhead panel and allow the instrument to perform its automatic 60 second countdown procedure. During the 60 second countdown, the instrument will measure the rate of battery depletion at maximum brightness and compare it to known depletion values.

NOTE

Holding both “DIM” buttons down during the 60 second countdown will force shutdown of the instrument without completing the battery depletion measurement.

- iv. Switch the power back on and ensure no further battery related messages are displayed. If battery warnings are still being displayed by the instrument, then refer to Section 5, Troubleshooting.

Scheduled Maintenance

1. 36 Month Battery Replacement (regardless of hours)

Data Reference: Section 6: Removal/Replacement
Section 9: Illustrated Parts Breakdown

- i. Replace the back-up Battery Assy(s) (Item 8) at 36-month intervals. Reference battery replacement procedure in Section 6, Removal/Replacement.

SECTION 5 TROUBLESHOOTING

1. If either an Attitude or Heading Indicator is unserviceable, replace with a serviceable unit. Contact Kelly Manufacturing for all questions and issues related to the Heading and Attitude Indicators.
2. If battery warnings are still being displayed after performing the Battery Condition inspection, then there is likely a reduced battery charge capacity. Replace the back-up battery. Reference battery replacement procedure in Section 6, Removal/Replacement.
3. Repairs to all other item(s) referenced within this document are **not** permitted. Contact Alpine Aerotech LP for further information if repairs are required to all other item(s) referenced within this document.

SECTION 6 REMOVAL/REPLACEMENT

General Notes

1. All Removal/Replacement instructions shall be accomplished in accordance with (IAW) standard aircraft practices. Refer to the current revision of the FAA Advisory Circular AC 43.13-1 and AC 43.13-2 for details on standard aircraft practices.
2. Torque fasteners IAW the tension type torque limits indicated in the most current revision of BHT-ALL-SPM, Chapter 2 unless otherwise specified.
3. All dimensions are in imperial measures (inches/pounds).
4. Refer to Section 4: Maintenance Instructions for instructions on maintenance for the item(s) referenced within this section.
5. Refer to Section 9: Illustrated Parts Breakdown for the part numbers of the item(s) referenced within this section.

Removal Instructions

1. Gain access to the aircraft and make the aircraft ready for maintenance.
2. Disconnect the Wiring Harnesses (Items 16, 17, 18 & 19) and associated Coax Cables (Item 14 & 15) and temporarily stow them. Reference Figure 4 and Appendix A.

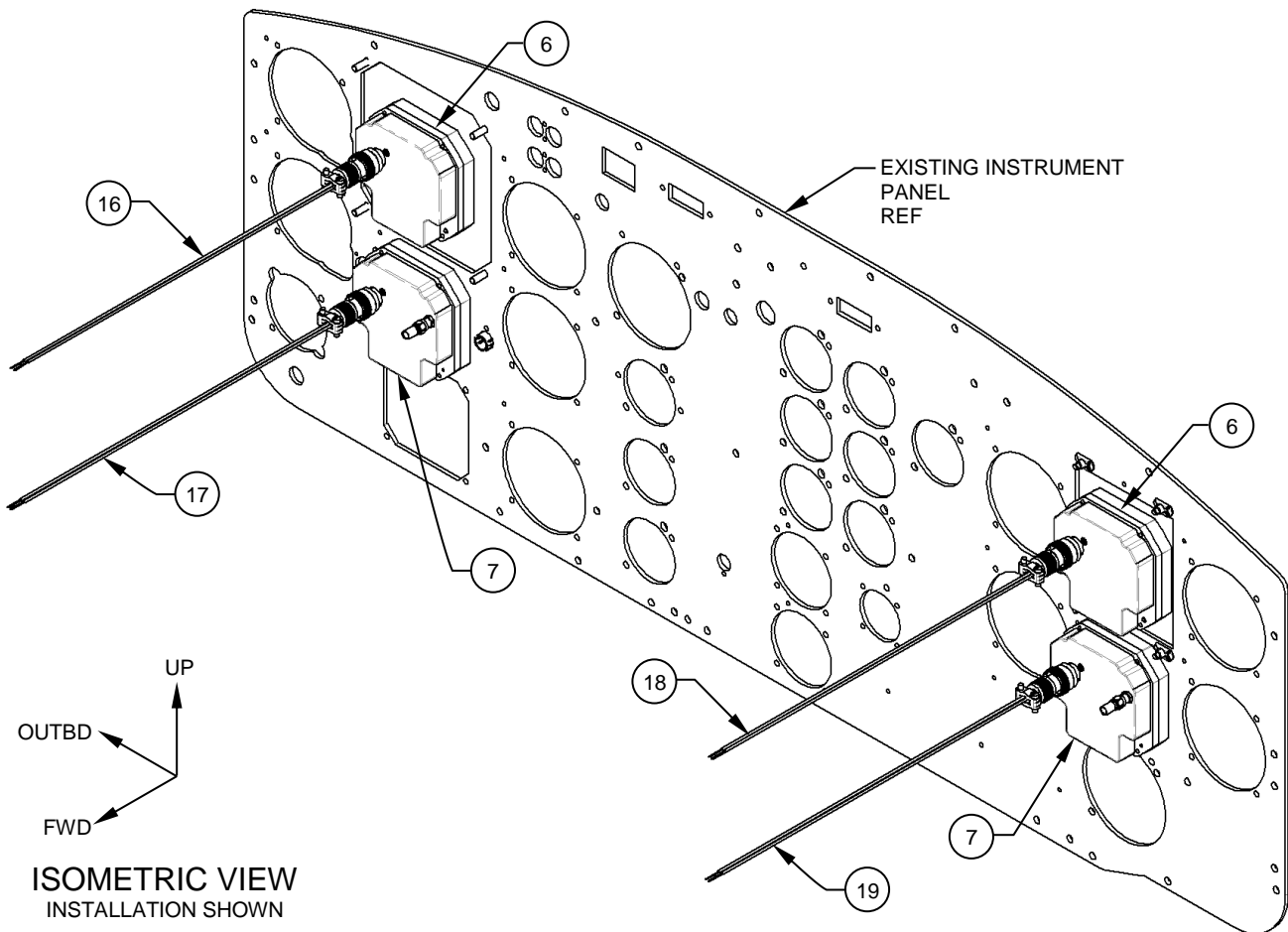


Figure 4
Instrument removal

3. On the RHS of the cockpit, remove all fasteners (Item 2) common to the Adaptor, Detail (Item 1) and remove the Adaptor, Detail, and the Attitude Indicator (Item 7) from the instrument panel as a unit. Remove the Heading Indicator directly from the existing instrument panel. Reference Figures 4 & 5.

Removal Instructions (cont.)

- On the LHS of the cockpit, remove all fasteners common to the Adaptor, Detail (Item 5) and remove the Adaptor, Detail, and the Attitude Indicator (Item 7) as a unit or alternately, remove the Attitude Indicator directly from the instrument panel (as applicable). Remove the Heading Indicator (Item 6) directly from the existing instrument panel. Reference Figure 6.

CAUTION

Use extreme care when handling the instruments and avoid touching the screen if at all possible. For proper care and handling refer to Kelly Manufacturing publication No. 1401-5 for the Heading Indicator and No. 1401-3 for the Attitude Indicator.

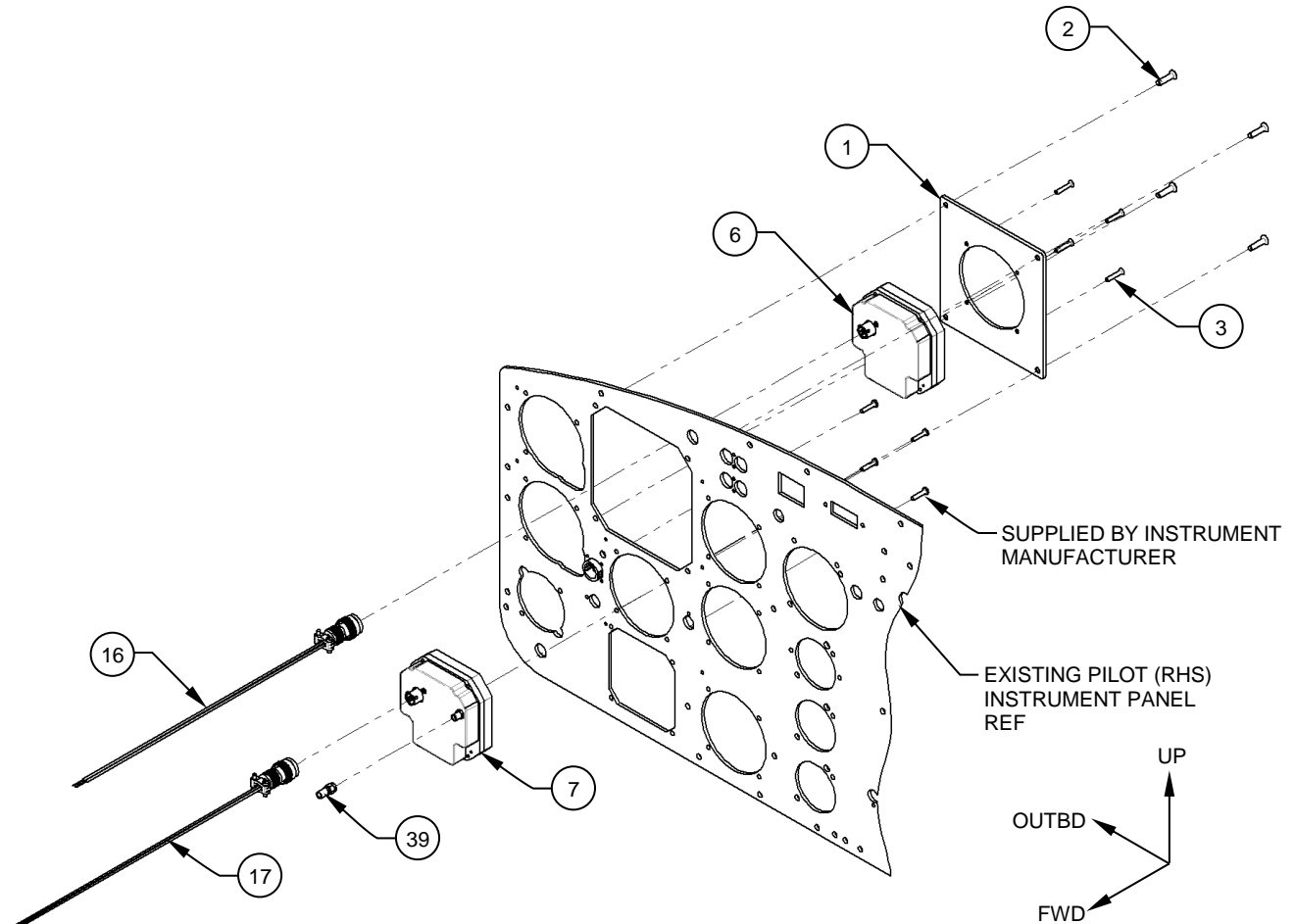


Figure 5
Instrument removal
Pilot (RHS) shown

ISOMETRIC VIEW
INSTALLATION SHOWN

Removal Instructions (cont.)

5. With the Adaptor, Details (Items 1 & 5 as applicable) and Attitude Indicator(s) (Item 7) on a bench, remove all fasteners (Item 3) common to the instruments. Treat all unserviceable instruments as if they are new to preserve the possibility of repair.

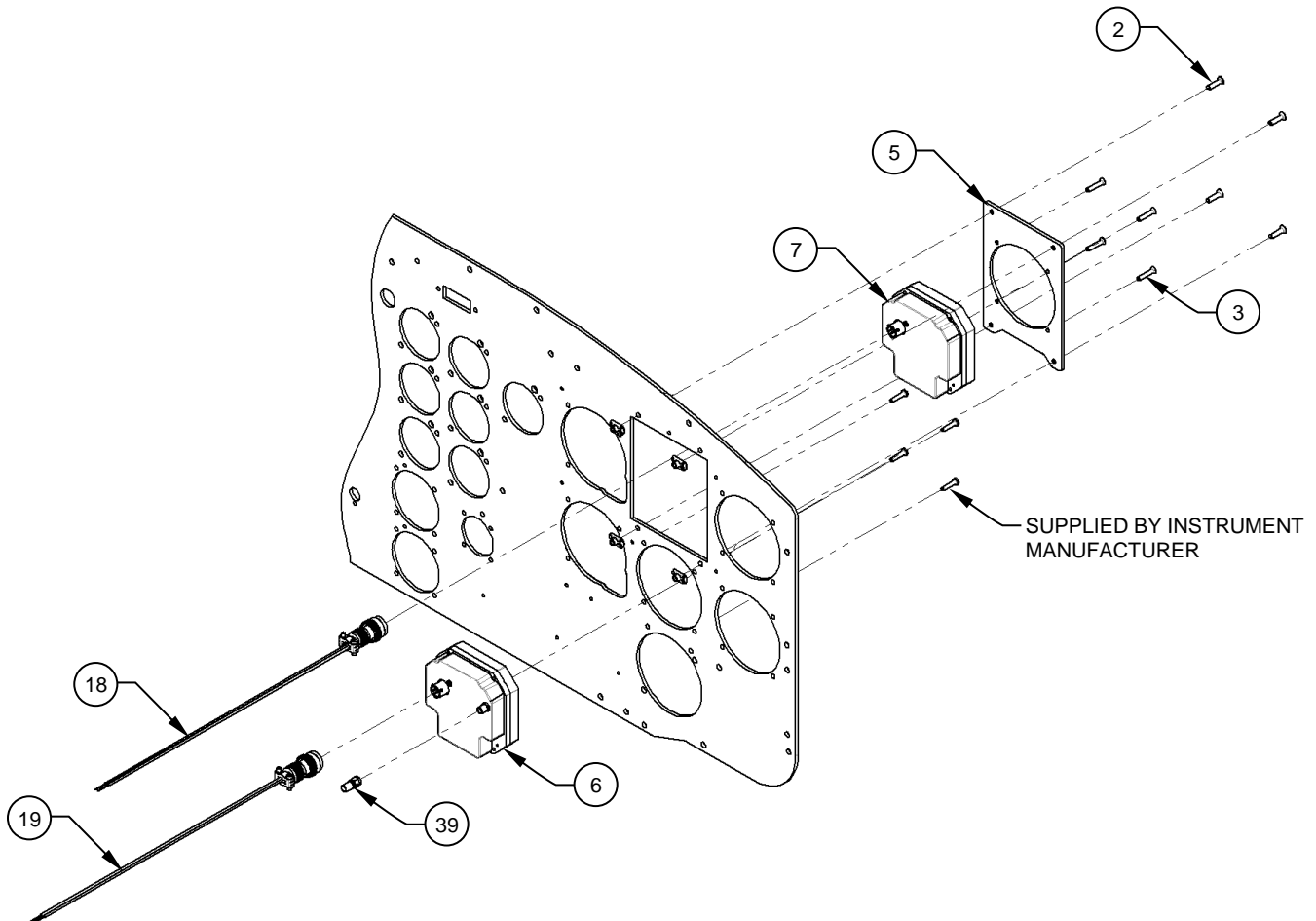


Figure 6
Instrument removal
Co-pilot (LHS) shown

6. Refer to Section 5, Troubleshooting for information regarding the repair of unserviceable instruments.

Replacement Instructions (cont.)

1. There are no special procedures for replacement of the Attitude (Item 7) and Heading (Item 6) Indicators; as such the replacement can be considered the opposite of the removal procedure.
2. Connect aircraft to external power and power up instruments. On initial start-up the instruments will show a blue “Self-Test” screen that will display a list of data including the instrument serial number. Record the serial number(s) in the ICA document as well as the logbook for future reference. After roughly 30 seconds the “Self-Test” will be cleared from the displays and a prominent red “X” will be displayed across the screens while the instrument initializes. The red “X” should not be present on the screens for more than 3 minutes.
3. Confirm that the instrument readings are stable.
4. Move the aircraft outside to allow the Heading Indicator(s) to acquire a GPS signal. The “NO GPS” indicator should extinguish once the signal is established.
5. Cycle power to the instruments one at a time using the associated circuit breakers in the overhead breaker panel to ensure proper breaker function.
6. Update the aircraft logbook for the replacement of the affected components of the Basic Digital Instrument, Kit.

Battery Replacement Instructions

1. Gain access to the back of the Attitude Indicator (Item 7).
2. Remove the two screws common to the battery cover and remove the cover. Reference Figure 7.

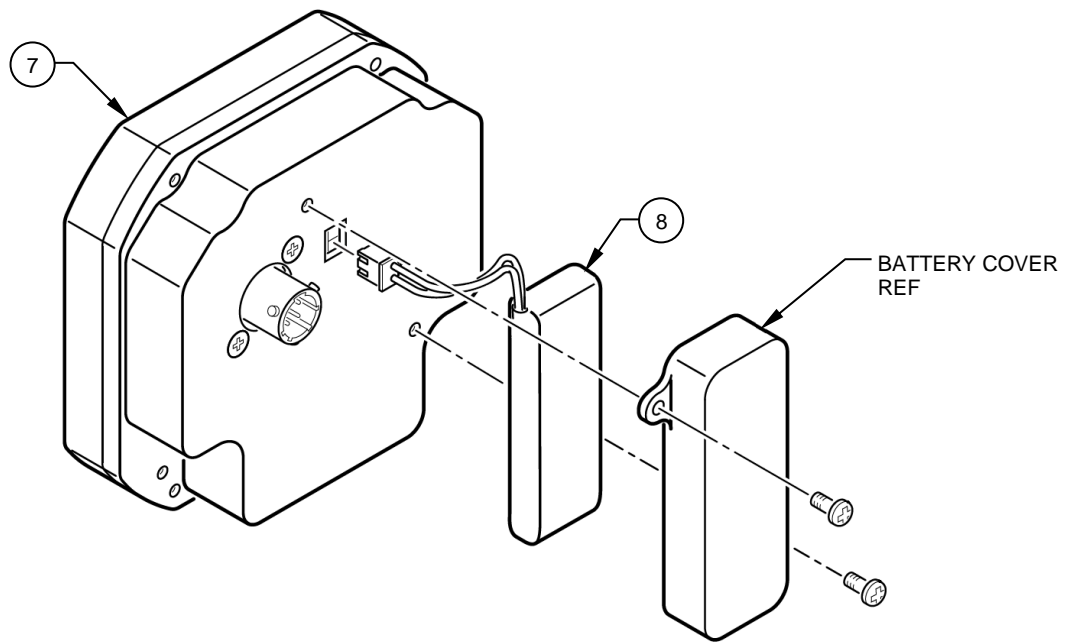


Figure 7
Back-up Battery
Replacement

3. Disconnect the Battery, Assy plug (Item 8) from the back of the Attitude Indicator (Item 7) and discard battery. Reference Figure 7.
4. Connect a new Battery, Assy and re-install the battery cover. Reference Figure 7.
5. Perform the Battery Condition inspection.
6. Update the aircraft logbook for the replacement of the back-up battery.

SECTION 7 GENERAL

Configuration Settings

The RCA2610 (Attitude Indicator) is supplied per the below “Standard Configuration” and is not configurable by the installer:

Description	Config. Setting
Panel Tilt Setting	14°
Mating Connector	MS3116E8-4S or equivalent
Color Scheme	Standard Blue & Brown
Display pointer style	Fixed

The RCA1510 (Heading Indicator) must be configured by the installer per the below table:

Description	Config. Setting
Indication Type	User Preference
Primary Heading Position	User Preference
Panel Tilt Set	14°
Flight Menu Style	User Preference

Refer to the following Kelly Manufacturing Company Installation/Operation Guide for instructions on setup/configuration:

Description	Pub. Number	Rev. (or later)
RCA 1510 Electric Digital Heading Indicator	1401-5	H*
RCA 2610 Electric Digital Horizon	1401-3	D*

*Contact Kelly Manufacturing Company to verify correct publication revision.

Magnetic Calibration

Refer to the following Kelly Manufacturing Company Installation/Operation Guide for instructions on magnetic calibration:

Description	Pub. Number	Rev. (or later)
RCA 1510 Electric Digital Heading Indicator	1401-5	H*

*Contact Kelly Manufacturing Company to obtain correct publication revision.

SECTION 8 AIRWORTHINESS LIMITATIONS

The Airworthiness Limitations section is approved by the Minister and specifies maintenance required by any applicable airworthiness or operating rule unless an alternative program has been approved by the Minister.

The Airworthiness Limitations section is FAA approved and specifies maintenance required under Sections 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

**Supplement to applicable Maintenance Manual,
Chapter 4, Airworthiness Limitations Schedule**

Notes

1. Refer to the BHT-205A-1-MM, Chapter 4, for general information on airworthiness limitations and airworthiness limitation schedules.
2. Item(s) **not** listed in the Scheduled Airworthiness Limitations section within this document have an unlimited airworthiness life.


Scheduled Airworthiness Limitations


1. There are no airworthiness limitations associated with the item(s) referenced within this document.

SECTION 9 ILLUSTRATED PARTS BREAKDOWN

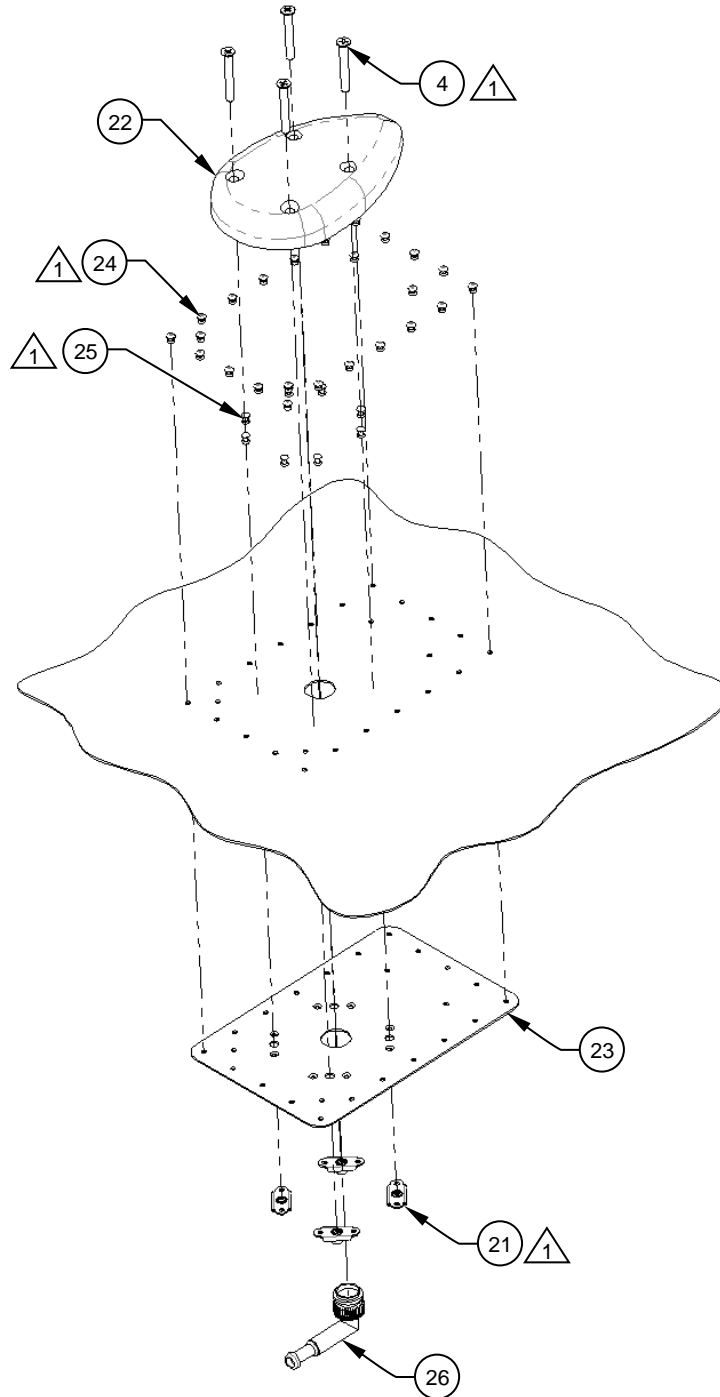
General Notes

1. Alternate items listed where applicable. Duplicate item numbers signify an alternate part number.

 Typical item number for all like items in this view unless otherwise specified.

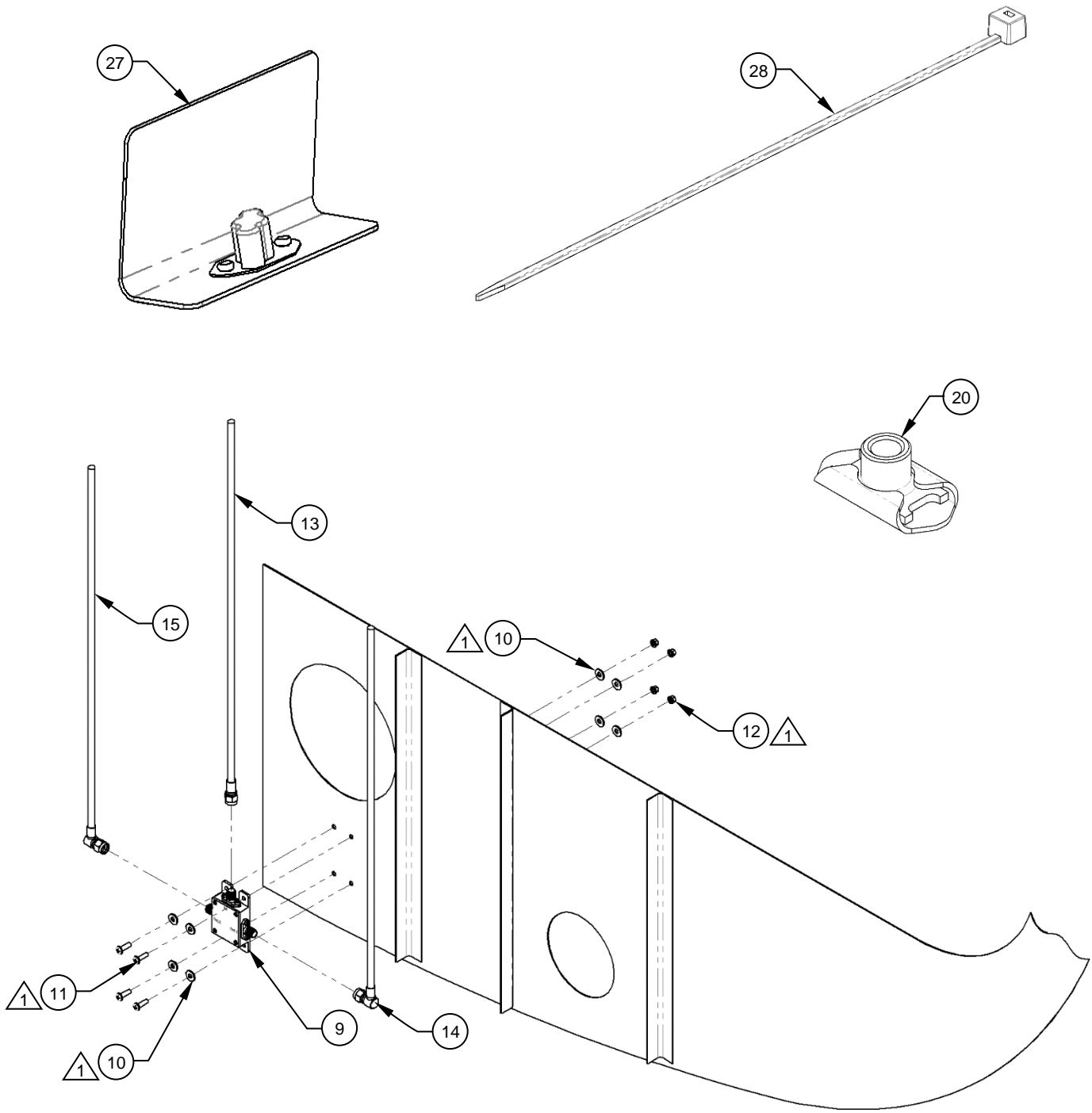
 Equipped from the manufacturer complete with a Battery, Assy (Item 8). Battery, Assy part number provided for replacement purposes.

Illustrated Parts Breakdown (cont.)



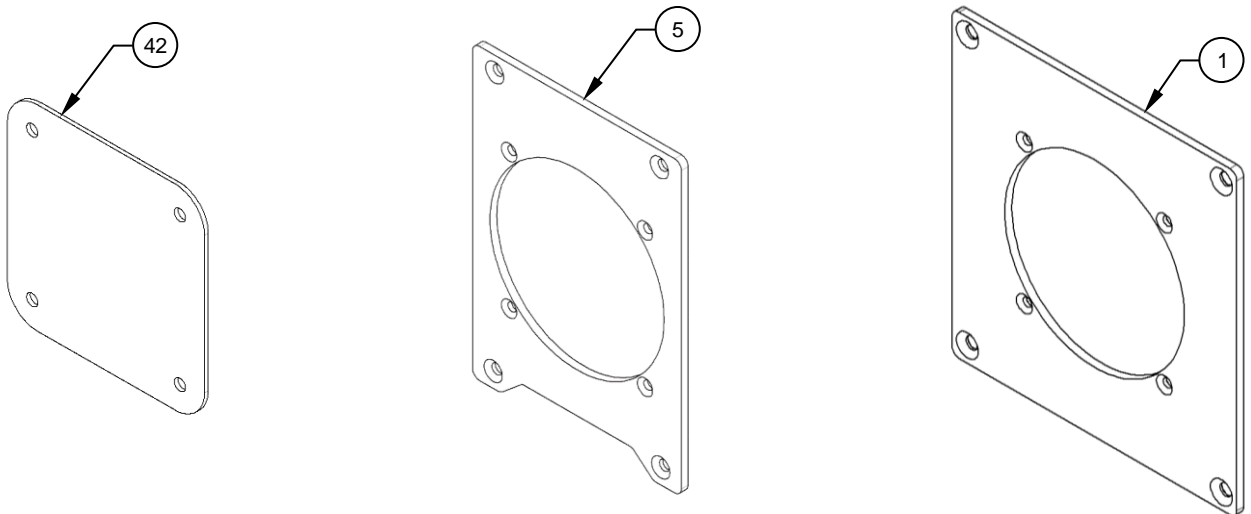
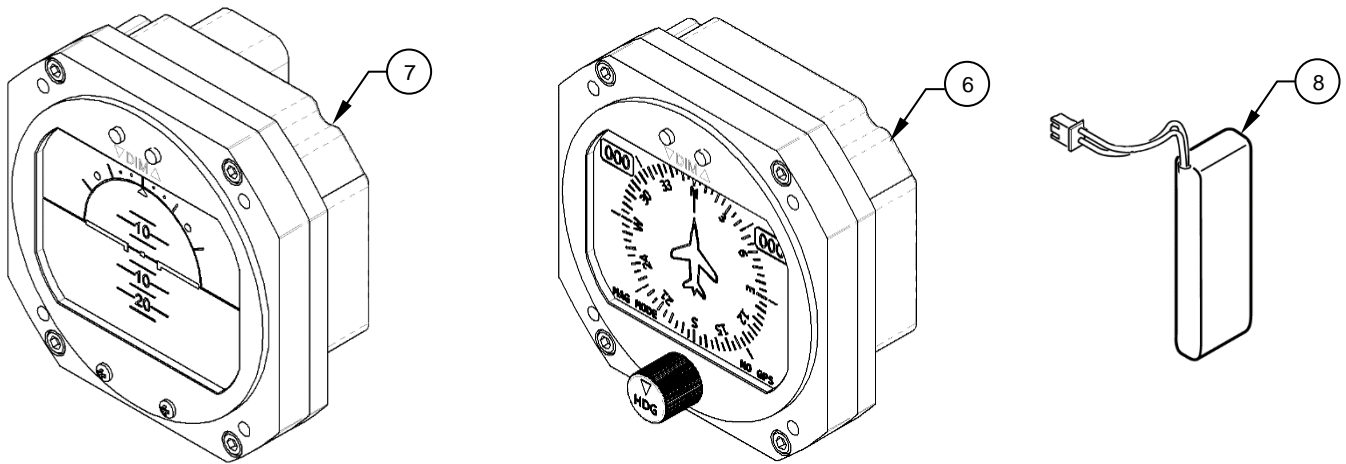
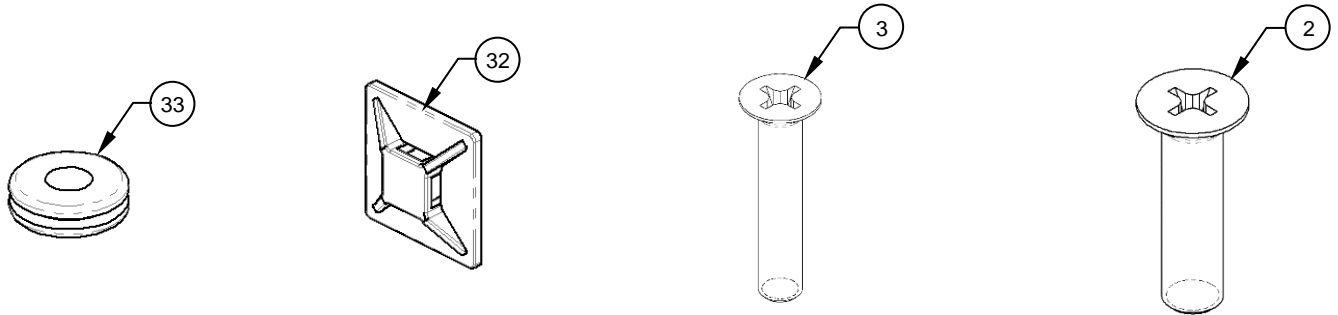
GPS Antenna
Installation Shown

Illustrated Parts Breakdown (cont.)

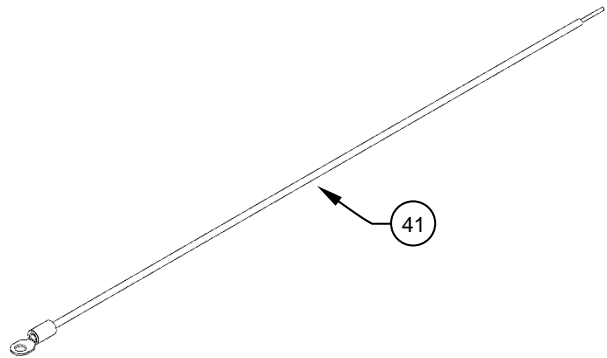
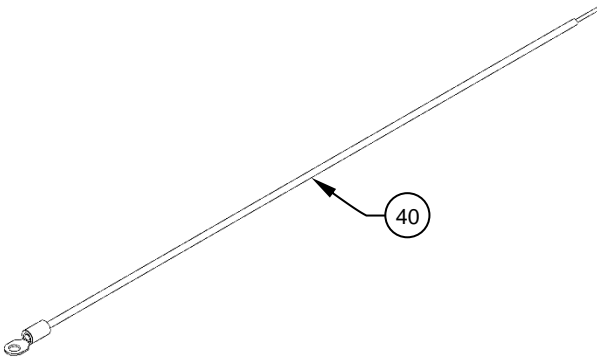
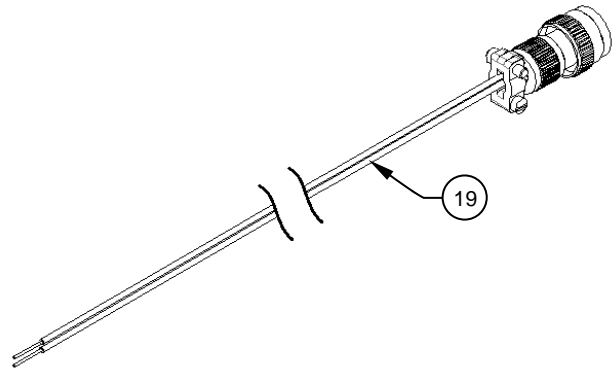
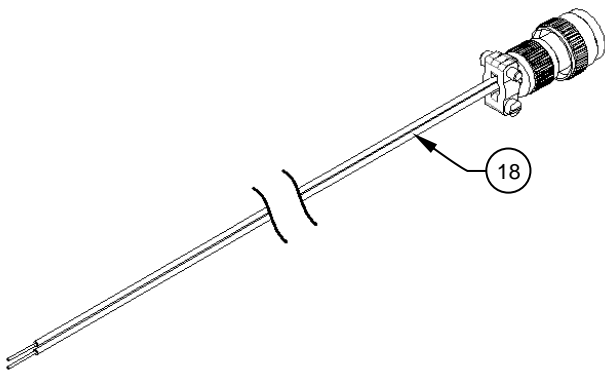
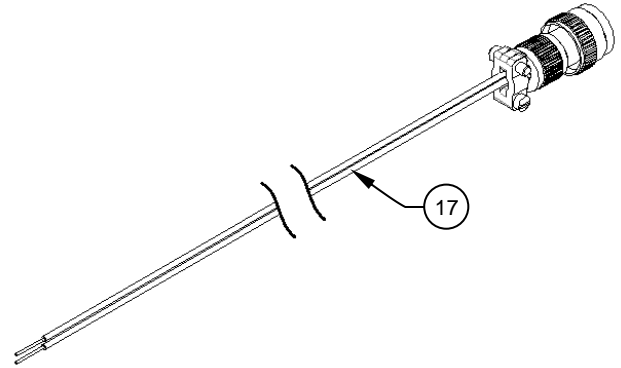
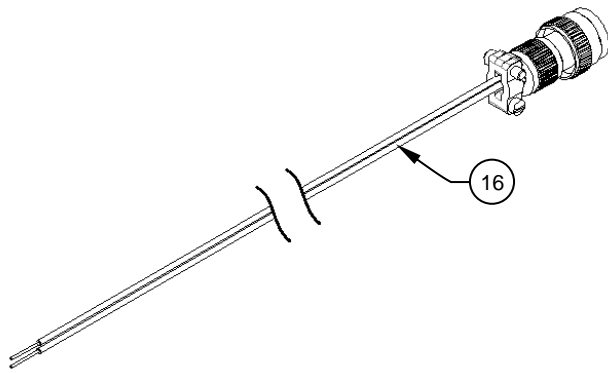


Splitter Installation shown

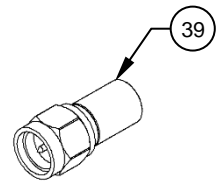
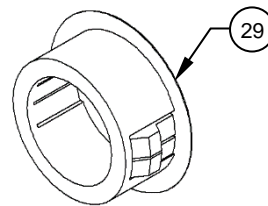
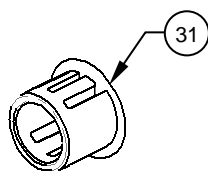
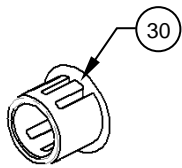
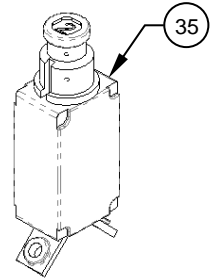
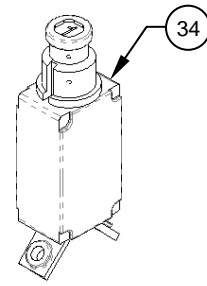
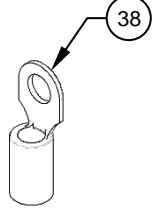
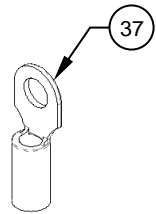
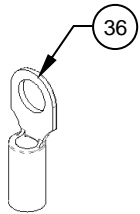
Illustrated Parts Breakdown (cont.)



Illustrated Parts Breakdown (cont.)



Illustrated Parts Breakdown (cont.)



Illustrated Parts Breakdown (cont.)

ITEM	QTY	NUMBER	DESCRIPTION	MATERIAL	REF STOCK SIZE	SPEC	FINISH	MANUFACTURER	NCAGEC
-	-	AAL-280-070-001	BASIC DIGITAL FLIGHT INSTRUMENT, KIT	C/O ITEMS BELOW				ALPINE AEROTECH LP	L0171
1	1	AAL-280-042-008	ADAPTOR, DETAIL	NA	NA	NA	NA	ALPINE AEROTECH LP	L0171
2	8	MS24693-BB274	SCREW, MACHINE	SEE SPEC	SEE SPEC	NASM24693	SEE SPEC	SOURCE AS REQUIRED	NA
3	8	MS24693-BB30	SCREW, MACHINE	SEE SPEC	SEE SPEC	NASM24693	SEE SPEC	SOURCE AS REQUIRED	NA
4	4	MS24693-C56	SCREW, MACHINE	SEE SPEC	SEE SPEC	NASM24696	SEE SPEC	SOURCE AS REQUIRED	NA
5	1	AAL-280-072-003	ADAPTOR, DETAIL	2024-T3	0.125	AMS 4462	SEE SPEC	ALPINE AEROTECH LP	L0171
6	2	103-0503-03-01	RCA1510-3 HEADING INDICATOR	NA	NA	NA	NA	KELLY MFG CO	08AF1
7	2	102-0403-11-11	RCA2610-3-G ATTITUDE INDICATOR	NA	NA	NA	NA	KELLY MFG CO	08AF1
8	2	635-0002-01	BATTERY, ASSY	SEE MFR	1.85 WATT HRS	SEE MFR	SEE MFR	KELLY MFG	08AF1
9	1	S12T-E-SF	SPLITTER, GPS	SEE MFR	SEE MFR	SEE MFR	SEE MFR	GPS SOURCE INC.	1RTJ5
10	8	NAS1149CN432R	WASHER, FLAT	SEE SPEC	SEE SPEC	NAS1149	SEE SPEC	SOURCE AS REQUIRED	NA
11	4	MS35206-215	SCREW, MACHINE, PAN-HEAD	SEE SPEC	SEE SPEC	NASM35206	SEE SPEC	SOURCE AS REQUIRED	NA
12	4	MS21043-04	NUT, SELF LOCKING	SEE SPEC	SEE SPEC	NASM21043	SEE SPEC	SOURCE AS REQUIRED	NA
13	1	AAL-280-071-001	COAX CABLE, ASSY	NA	NA	NA	NA	ALPINE AEROTECH LP	L0171
14	1	AAL-280-071-002	COAX CABLE, ASSY	NA	NA	NA	NA	ALPINE AEROTECH LP	L0171
15	1	AAL-280-071-003	COAX CABLE, ASSY	NA	NA	NA	NA	ALPINE AEROTECH LP	L0171
16	1	AAL-280-041-008	WIRING HARNESS, ASSY	NA	NA	NA	NA	ALPINE AEROTECH LP	L0171
17	1	AAL-280-041-007	WIRING HARNESS, ASSY	NA	NA	NA	NA	ALPINE AEROTECH LP	L0171
18	1	AAL-280-041-006	WIRING HARNESS, ASSY	NA	NA	NA	NA	ALPINE AEROTECH LP	L0171
19	1	AAL-280-041-005	WIRING HARNESS, ASSY	NA	NA	NA	NA	ALPINE AEROTECH LP	L0171
20	4	CB6014CR08-1P	CLICK-BOND, FLOATING TWO LUG NUT PLATE	SEE MFR	SEE MFR	SEE MFR	SEE MFR	CLICK BOND	66530
21	4	MS21059L08	NUT PLATE, SELF LOCKING	SEE SPEC	SEE SPEC	NASM21060	SEE SPEC	SOURCE AS REQUIRED	NA
22	1	013-00235-00	GA 35 GPS ANTENNA	SEE MFG	SEE MFG	SEE MFG	SEE MFG	GARMIN	NA
23	1	AAL-280-042-002	DOUBLER, DETAIL	2024-T3	0.04	AMS 4036	SEE SPEC	ALPINE AEROTECH LP	L0171
24	24	MS20470AD3-3-5	RIVET, SOLID, UNIVERSAL HEAD	SEE SPEC	SEE SPEC	NASM20470	SEE SPEC	SOURCE AS REQUIRED	NA
25	8	MS20426AD3-4	RIVET, SOLID, COUNTERSUNK HEAD	SEE SPEC	SEE SPEC	NASM20426	SEE SPEC	SOURCE AS REQUIRED	NA
26	1	225554-6	TNC CONNECTOR, RIGHT ANGLE	SEE SPEC	SEE SPEC	MIL-STD-348	SEE SPEC	TE CONNECTIVITY	U0HF6
26	1	PE4450	TNC CONNECTOR, RIGHT ANGLE	SEE MFR	SEE MFR	SEE MFR	SEE MFR	PASTERNAK	53919
27	1	AAL-280-041-009	CLIP, ASSY	NA	NA	NA	NA	ALPINE AEROTECH LP	L0171
28	30	MS3367(-)-9	STRAP, TIE DOWN, ELECTRICAL	SEE SPEC	SEE SPEC	AS33671	SEE SPEC	SOURCE AS REQUIRED	NA


Illustrated Parts Breakdown (cont.)

ITEM	QTY	NUMBER	DESCRIPTION	MATERIAL	REF STOCK SIZE	SPEC	FINISH	MANUFACTURER	NCAGEC
29	1	85985K21	CAP-PLUG, PLASTIC	SEE MFR	SEE MFR		SEE MFR	COMMERCIAL	
30	16	245-049	CAP-PLUG, PLASTIC	SEE MFR	SEE MFR	SEE MFR	SEE MFR	SPAENAU	94223
31	2	245-044	CAP-PLUG, PLASTIC	SEE MFR	SEE MFR	SEE MFR	SEE MFR	SPAENAU	94223
32	4	ABMM-A-C	CABLE TIE MOUNT	ABS	.75 X .75	SEE MFR	SEE MFR	PANDUIT CORP.	6383
33	2	MS35489-6	GROMMET, RUBBER	SEE SPEC	SEE SPEC	MS35489	SEE SPEC	SOURCE AS REQUIRED	NA
34	2	MS22073-1	CIRCUIT BREAKER, TRIP FREE, PUSH-PULL	SEE SPEC	SEE SPEC	AS22073	SEE SPEC	SOURCE AS REQUIRED	NA
35	2	MS22073-2	CIRCUIT BREAKER, TRIP FREE, PUSH-PULL	SEE SPEC	SEE SPEC	AS22073	SEE SPEC	SOURCE AS REQUIRED	NA
36	4	MS25036-103	TERMINAL LUG, CRIMP STYLE	SEE SPEC	SEE SPEC	SAE-AS25036	SEE SPEC	SOURCE AS REQUIRED	NA
37	4	MS25036-149	TERMINAL LUG, CRIMP STYLE	SEE SPEC	SEE SPEC	SAE-AS25036	SEE SPEC	SOURCE AS REQUIRED	NA
38	2	MS25036-153	TERMINAL LUG, CRIMP STYLE	SEE SPEC	SEE SPEC	SAE-AS25036	SEE SPEC	SOURCE AS REQUIRED	NA
39	2	142-0408-011	SMA CONNECTOR, STRAIGHT	SEE SPEC	SEE SPEC	MIL-STD-348	SEE SPEC	CINCH CONNECTIVITY	34078
40	1	AAL-280-071-004	WIRING HARNESS, ASSY	NA	NA	NA	NA	ALPINE AEROTECH LP	L0171
41	1	AAL-280-071-005	WIRING HARNESS, ASSY	NA	NA	NA	NA	ALPINE AEROTECH LP	L0171
42	2	AAL-280-072-006	BLANKING PLATE, DETAIL	NA	NA	NA	NA	ALPINE AEROTECH LP	L0171
C01	1	NA	SEALANT, CORROSION INHIBITIVE	PS 870 CLASS B	SEE MFR	MIL-PRF-81733	NA	PRC-DESOTO INTERNATIONAL	83574
C02	1	HYSOL EA 9309.3NA	HYSOL EPOXY PASTE ADHESIVE	EA 9309.3NA	NA	SEE MFR	NA	HENKEL LOCTITE	79436

APPENDIX: A ELECTRICAL CONNECTIONS

Electrical Notes

This appendix outlines the electrical details associated with the installation of the Basic Digital Flight Instrument, Kit and includes the wiring schematic.

1. Unless otherwise specified, all wiring terminations at connectors shall be IAW BHT-ELECT-SPM Chapters 4, 5 and 7 and the connector manufacturer's instructions or applicable military or commercial standard for stripping procedures, crimping procedures and required tooling.
 2. Use existing ground stud or ground block if available. If new ground studs or ground blocks are required, install IAW BHT-ELECT-SPM, Chapter 8.
 3. All wiring shall be routed and secured IAW BHT-ELECT-SPM, Chapter 6. Particular attention to minimum bend radii, clamp spacing, service loop separation from control, and fluid and oxygen systems must be observed.
 4. Refer to ICA document AAL-280-075-701, Section 9: Illustrated Parts Breakdown for the part numbers of the item(s) referenced within this appendix.
 5. All solder connections are to be made using a rosin flux cored solder wire (63% tin, 37% lead) and following standard aircraft practices.
-  Connect to 28VDC essential bus. Trim Wiring Harness, Assys (Item 40 & 41) as short as is practical.

1. Wiring Schematic

