



AMS 2000, ALTITUDE ALERT SYSTEM

PRODUCT P/N: 8900

INSTALLATION MANUAL

REV M

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MANUAL P/N: IN8900A

INSTALLATION MANUAL
AMS 2000, ALTITUDE ALERT SYSTEM
P/N 8900

Rev M

Page i of ii

PAGE CONTROL CHART

| <u>SECTION.</u> | <u>DESCRIPTION</u> | <u>PAGE</u> |
|-----------------|---|-------------|
| <u>NO</u> | | |
| 1. | OVERVIEW | 1-1 |
| 1.1 | The Manual | 1-1 |
| 1.2 | Product Description | 1-1 |
| 1.3 | Specifications | 1-2 |
| 2. | INSTALLATION PROCEDURE | 2-1 |
| 2.1 | Unpacking and Inspecting Equipment | 2-1 |
| 2.2 | Mounting/Cooling Considerations | 2-1 |
| 2.3 | Mechanical Installation | 2-1 |
| 2.4 | Electrical Installation | 2-2 |
| 2.4.1 | Functional Pinout Description | 2-2 |
| 2.5 | Calibration | 2-3 |
| 2.6 | General Information | 2-3 |
| 2.7 | Post Installation Test Procedure | 2-4 |
| 3. | ENVIRONMENTAL QUALIFICATION FORM | 3-1 |
| 4. | INSTALLATION DRAWINGS AND INSTALL KITS PARTS LISTS | 4-1 |

| <u>DWG No.</u> | <u>Description/ Part Number</u> | <u>DATE</u> | <u>REV</u> |
|----------------|--|-------------|------------|
| 4089-023 | Installation, Altitude Management System P/N 8900 | 9/08/05 | E |
| 4089-026 | Installation, Altitude Management System P/N 8900 | 9/08/05 | D |
| 4089-024 | Installation, Altitude Management System P/N 8900 | 9/08/05 | D |
| N/A | Install Kit, Alt Management System P/N IK8900 | 8/03/07 | B |

**INSTALLATION MANUAL
AMS 2000, ALTITUDE ALERT SYSTEM
P/N 8900**

Rev M

Page ii of ii

REVISION LOG

| REV. | DATE | APP'D | DESCRIPTION |
|------|----------|-------|--|
| E | 8-11-00 | BVM | Baseline release of separate Install Manual |
| F | 10-30-00 | ZK | Changed Installation Altitude Management System 4089-023, -026, -024 |
| G | 4-21-03 | ZK | Updated 4089-023 |
| H | 6-3-03 | ZK | Added Post Installation Test Procedure |
| J | 9-08-05 | WMP | Added notes that Gray code lines were not isolated. ECO 0504/026 |
| K | 8-30-06 | CB | Updated Company Logo |
| L | 8-3-07 | DU | Updated IK8900 |
| M | 11-25-08 | RWC | Added illustration to show Jumper S3 location |
| | | | |

The information in this manual is subject to change without notification. To ensure complete and current updates, note the Revision Log above and call Technical Assistance for updated information.

INSTALLATION MANUAL
AMS 2000, ALTITUDE ALERT SYSTEM
P/N 8900

Rev M

Page 1-1

1. OVERVIEW

1.1 The Manual

This manual contains information relative to the installation of the AMS 2000 and the devices that encompass the Altitude Preselect. The drawings and descriptions will enable the interfacing to the complete system.

1.2 Product Description

AMS 2000 is an Altitude Management and Alert System. Its purpose is to alert you when you are approaching or deviating from your target altitude. Other features include alerts when you reach your Decision Height or Minimum Descent Altitude, and a landing gear reminder when you approach your destination altitude. AMS 2000 also will calculate density altitude and engine performance. These alerts and calculations help you fly safer and easier.

AMS 2000 does not act as an auto pilot, or control the aircraft in any way. Think of it as an assistant to you, the pilot, which keeps track of minor details and frees you to fly the aircraft. No longer do you have to keep both eyes on the sky and one on the altimeter.

AMS 2000 receives its altitude information from your encoder, and displays it in 100 foot increments. When connected to a Falcon Altitude Encoder or Converter, AMS 2000 displays altitude in 10 foot increments, and also offers a page displaying Instantaneous Vertical Speed (IVS). IVS display does not have the lag inherent in static system VSI displays.

INSTALLATION MANUAL
AMS 2000, ALTITUDE ALERT SYSTEM
P/N 8900

Rev M

Page 1-2

1.3 Specifications

Physical Specifications

| | |
|--------|-----------------------------|
| Size | 1.5 x 3.125 x 5.75 (inches) |
| Weight | 0.8 lbs |

Electrical and Functional

| | |
|------------------------|---|
| Power | 14 to 28 VDC 150 mA max |
| Protection | Not internally fused |
| Inputs | |
| Gray Code | 11 pins, not isolated - 10 signal, 1 return, no diode isolation |
| Serial | RS-232 |
| Outputs | |
| Audio Out | Variable frequency and amplitude |
| Audio Switch | Return, sink up to 2.0 ADC |
| Altitude Display Range | -1000 feet of upper limit of encoder |
| Resolution | 100 feet (10 feet with Serial Encoder) |

Environmental

RTCA/DO-160B

| | |
|----------------------------|--|
| Categories: | C1CAPKXXXXXXXXZBABZAA |
| Operating Temperature: | -10° C to +50° C |
| Operating Altitude: | Up to 55,000 ft |
| Storage Temperature: | -55° to + 85° C |
| In-Flight Loss of Cooling: | Equipment can run indefinitely with no cooling |
| Regulatory: | TSO-C88a |
| Barometric Pressure Range | 28.00" to 30.99" |

INSTALLATION MANUAL
AMS 2000, ALTITUDE ALERT SYSTEM
P/N 8900

Rev M

Page 2-1

2. INSTALLATION PROCEDURE

2.1 Unpacking and Inspecting Equipment

Exercise extreme care when unpacking the equipment. Make a visual inspection of the unit for evidence of damage incurred during the shipment. If a claim for damage is to be made, save the shipping containers to substantiate the claim. The claim should be promptly filed with the transportation company. It would be advisable to retain the container and packaging material after all equipment has been removed, in the event that equipment storage or reshipment should become necessary.

2.2 Mounting/Cooling Considerations

The conditions and tests required for TSO approval of this article are minimum performance standards. It is the responsibility of those installing this article either on or within a specific type or class of aircraft to determine that the aircraft installation conditions are within the TSO standards. TSO articles must have separate approval for installation in an aircraft. The article may be installed only if performed under 14 CFR part 43 or the applicable airworthiness requirements.

The AMS 2000 should be installed in accordance with the standards established by the customer's installing agency and existing conditions, as to unit location and type of installation. However, the following suggestions should be considered before installing the AMS 2000. Close adherence to these suggestions will assure a more satisfactory performance from the equipment. The installing agency will supply and fabricate all external cables. The connectors required are supplied by Shadin.

The AMS 2000 does not require a forced air cooling system.

2.3 Mechanical Installation

The AMS 2000 installation will conform to standards designated by the customer's installing agency, and existing conditions as to unit location and type of installation. Attached drawing 4089-023 provides the installation information for the AMS 2000 and components of the Altitude Alert System.

Refer to Install Kit IK8900 for parts list, descriptions, and attached drawings for details.

INSTALLATION MANUAL
AMS 2000, ALTITUDE ALERT SYSTEM
P/N 8900

Rev M

Page 2-2

2.4 Electrical Installation

The AMS 2000 will operate with an input range from 14 to 28VDC. Refer to the attached interconnect drawing 4089-023.

The installing facility will supply and fabricate all external cables. The required connectors are included in the install kit. The length and routing of external cables must be carefully measured and planned before the actual installation is attempted. Avoid sharp bends or locating cables near aircraft controls. To ensure optimum performance from the system, the AMS 2000 and associated wiring must be kept at least a minimum of three feet from high noise sources and must not be routed with cables from high power sources.

Prior to the AMS 2000 installation, a point to point continuity check of the wiring harness should be done to verify proper wiring. The aircraft power input to the unit should be made to ensure that power is supplied only to the specified power pin(s).

2.4.1 Functional Pinout Description

This section gives a brief description of the inputs and outputs relating to the connector on the AMS 2000.

- A. Pin 8: +28VDC Power
Pin 15: GND

Pin 8 is the DC aircraft power input. The AMS 2000 input voltage is 14-28VDC. Pin 15 is the DC aircraft power ground. All power required shall come from the aircraft power bus (12-28V). Maximum power shall be determined as follows:

$$(28V) \times (300mA) \text{ Watts} = 8.4 \text{ Watts}$$

- B. Pin 7: Audio Switch

Pin 7 is the return line that can sink up to 2.0 ADC

- C. Pin 6: Audio Out

Pin 6 is the variable frequency and amplitude audio out line

- D. Altitude In

INSTALLATION MANUAL
AMS 2000, ALTITUDE ALERT SYSTEM
P/N 8900

Rev M

Page 2-3

The AMS 2000 can be selected to receive Gray code or serial data input. Use Jumper S3 to select serial or Gray code input as indicated (See figure 2-1).

1. Serial option - In Serial mode Pin 14 is the RX, RS-232 communication line that is used to receive serial data from the encoder (8800-X) or Serializer (9200-X). Pins 1-5 and Pins 9-13 should not be used while in serial input mode. Refer to installation drawing #4089-023.
2. Gray Code option - When using Gray Code input mode, Pins 1-5 and Pins 9-13 are connected to A1, A2, A4, B1, B2, B4, C1, C2, C4. If D4 is available for altitudes above 30,700 ft, HD1 should be set 1-3 and D4 connected to Pin 1. Pin 14 is not used. Refer to Installation Dwg. #4089-026. Configure jumpers S1 and S2, which connect internal pull-ups on Gray code line, depending on transponder and system requirements. None of the lines is isolated.

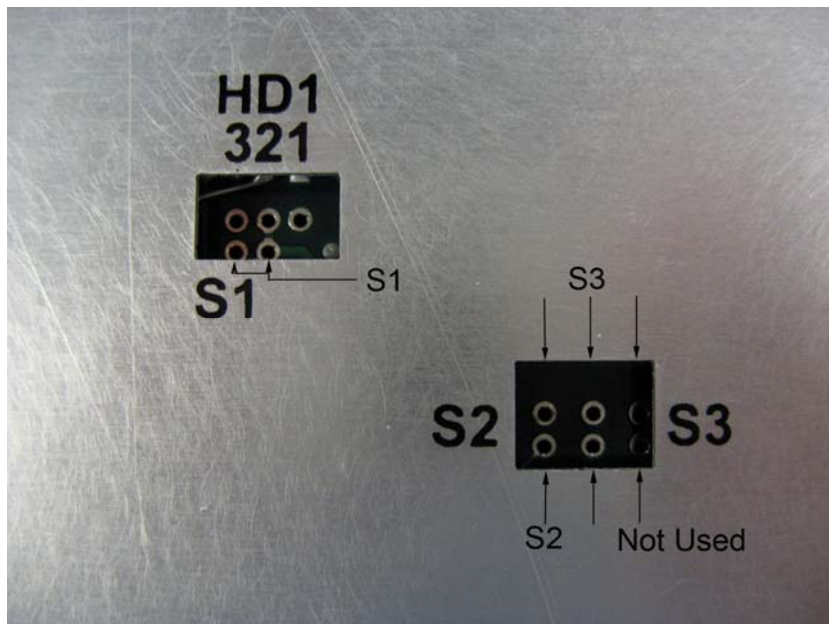


Figure 2-1. S3 Jumper Location for Gray Code

2.5 Calibration

No calibration is needed for this device.

2.6 General Information

For an explanation of the operating controls of the AMS 2000, refer to Operating Guide P/N: OP8900A.

**INSTALLATION MANUAL
AMS 2000, ALTITUDE ALERT SYSTEM**

| |
|-------|
| Rev M |
|-------|

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|----------|
| P/N 8900 |
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| Page 2-4 |
|----------|

2.7 Post Installation Test Procedure

1. Verify proper jumper selection per drawing 4089-024.
2. Aircraft power on.
3. Refer to Operation Guide to verify operation of 30 second self test.
4. Set Baro Pressure to match Altimeter.
5. Select Baro Altitude page and verify Altitude matches Altimeter.
6. Refer to Operation Guide to select user options and alerts.

**INSTALLATION MANUAL
AMS 2000, ALTITUDE ALERT SYSTEM**

Rev M

P/N 8900

Page 3-1

3. ENVIRONMENTAL QUALIFICATION FORM

RTCA/DO-160B Certification

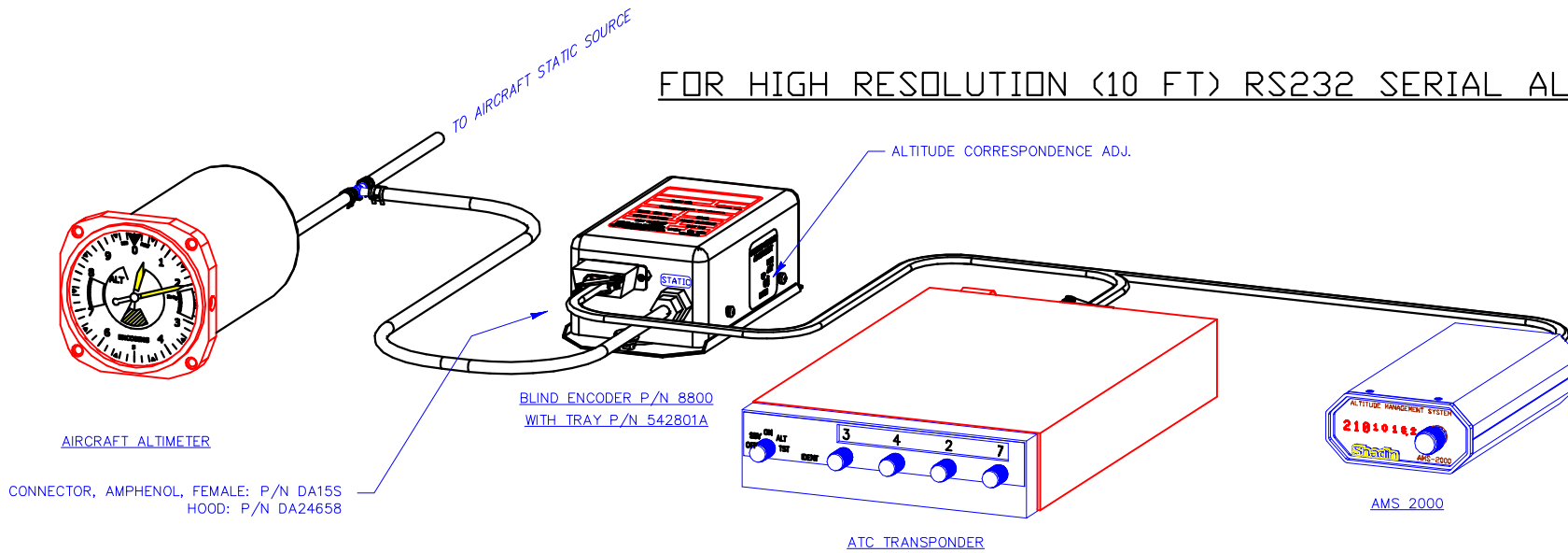
| <u>Conditions</u> | <u>Section No.</u> | <u>Categories</u> |
|-------------------------------------|------------------------|-------------------|
| Temperature & Altitude | 4 | C1 |
| Temperature Variation | 5 | C |
| Humidity | 6 | A |
| Operational Shocks | 7 | – |
| Vibration | 8 | P, K, S |
| Explosion Proofness | 9 | X |
| Waterproofness | 10 | X |
| Fluids Susceptibility | 11 | X |
| Sand & Dust | 12 | X |
| Fungus Resistance | 13 | X |
| Salt Spray | 14 | X |
| Magnetic effect | 15 | Z |
| Power Input | 16 | B |
| Voltage Spike | 17 | A |
| Audio Frequency Conducted. Suscept. | 18 | B |
| Induced Signal Susceptability. | 19 | Z |
| Radio Frequency Susceptability | 20 | A |
| Radio Frequency Emissions | 21 | A |

**INSTALLATION MANUAL
AMS 2000, ALTITUDE ALERT SYSTEM
P/N 8900**

SECTION 4.

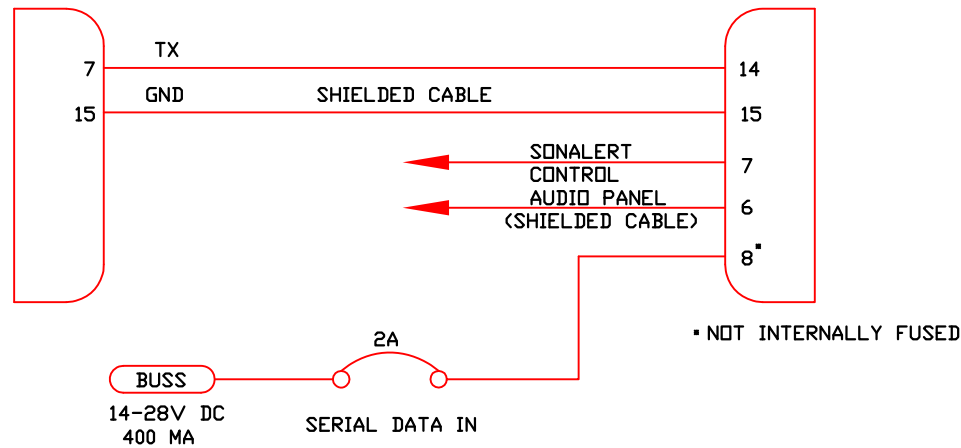
**INSTALLATION DRAWINGS AND
INSTALL KIT PARTS LISTS**

FOR HIGH RESOLUTION (10 FT) RS232 SERIAL ALTITUDE



SHADIN P/N 8800 ALTITUDE ENCODER

AMS-2000



| | |
|--------------|------|
| D | 3 |
| D | 2 |
| E | 1 |
| REV. | PAGE |
| PAGE HISTORY | |

| 0504/026 | E | 9/08/05 | PAB | WMP | "PULL-UP" TABLE WAS "TRANSPONDER TYPE"; REMOVED AT-50 TRANSPONDER |
|----------|------|----------|-----|-------|---|
| 0304/032 | D | 4/21/03 | PAB | ZK | PG 1 REDRAWN; REMOVED HIGH ALTITUDE ADJ. |
| 0010/033 | C | 10/30/00 | PAB | ZK | SWAP DEPICTIONS OF PINS 1 & 3 ON HD1 (PAGE THREE) |
| 9803/012 | B | 3/20/99 | SRB | BVM | CORRECT JUMPER LOCATION, CONVERT TO CAD |
| N/A | A | 8/23/94 | DAP | SES | REDRAWN TO 3 SHEETS |
| N/A | - | 4/8/94 | DAP | SES | BASELINE RELEASE |
| ECO # | REV. | DATE | BY | APP'D | DESCRIPTION |

| | | |
|--|-----|-------------------------|
| UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES | | DRAWING DATE 4/8/94 |
| TOLERANCES: X.X = ±0.1 X.XX = ±0.01 X.XXX = ±0.005 | | DRAFTER DAP |
| FINISH: | N/A | APPROVED SES |
| MATERIAL: | N/A | FILE NAME 8900EJ.DWG |
| NOT TO SCALE | | DIRECTORY 8900 |
| | | SHEET 1 OF 3 |

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MINNEAPOLIS, MN 55426

INSTALLATION,
ALTITUDE
MANAGEMENT
SYSTEM

DRAWING NO. 4089-023 SIZE A P/N 8900 REV E

FOR 100 FT RESOLUTION GRAY CODE ALTITUDE

AMS-2000

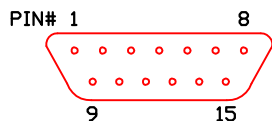
| PULL-UP CONFIGURATION | | |
|-----------------------|--------|--------|
| PULL-UP SIG | S1 | S2 |
| INTERNAL | CLOSED | CLOSED |
| EXTERNAL | OPEN | OPEN |
| W/O TRANSPONDERS | CLOSED | CLOSED |

| SERIAL INPUT SELECT | |
|---------------------|--------|
| TYPE OF INPUT | S3 |
| GRAY CODE INPUT | OPEN |
| SERIAL DATA INPUT | CLOSED |

⚠ D4 LINE REQUIRED FOR ALTITUDE ABOVE 30,700 FT. CONNECT IF AVAILABLE.

AMS-2000

CONNECTOR PIN ARRANGEMENT

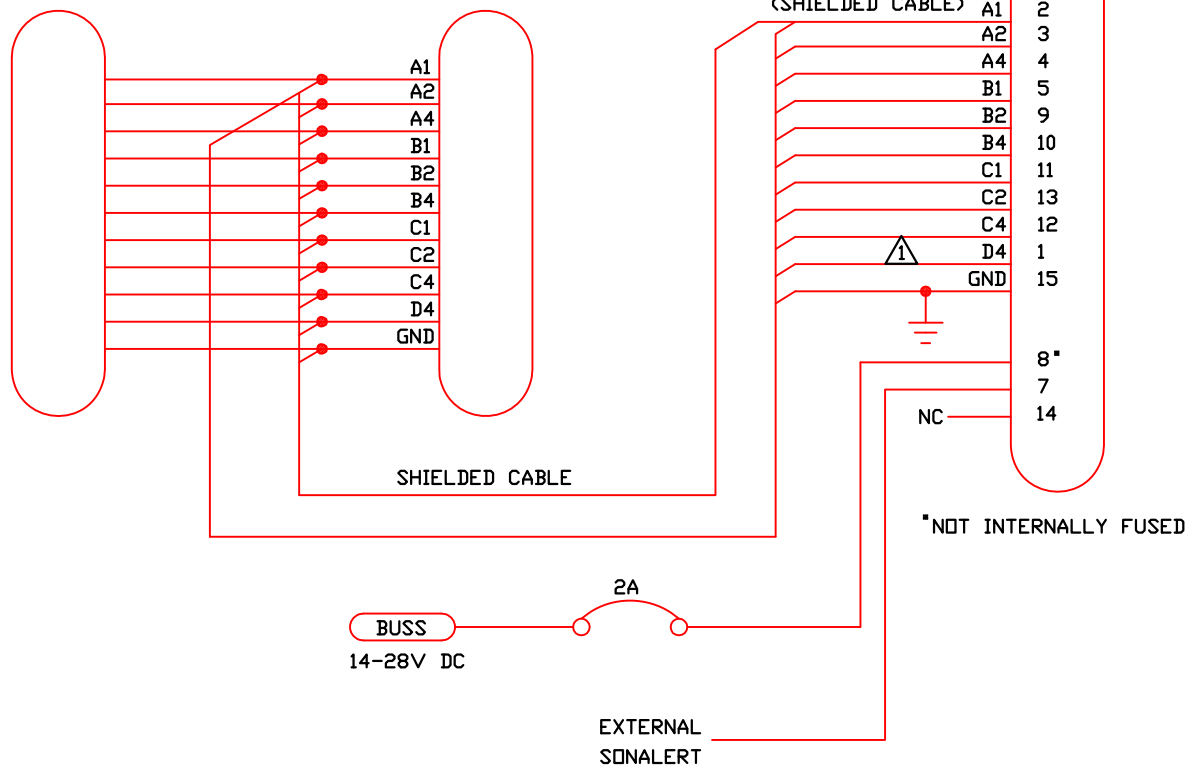


(VIEWED FROM SOLDER SIDE OF FEMALE CONNECTOR)

GENERIC MODE C
ALTITUDE
ENCODER

ATC
TRANSPONDER

TO AIRCRAFT AUDIO PANEL
(SHIELDED CABLE)



*NOT INTERNALLY FUSED

PARALLEL DATA INPUT

INSTALLATION, ALTITUDE
MANAGEMENT SYSTEM

| | | |
|----------|------|----------|
| 0504/026 | D | 9/8/05 |
| 0010/033 | C | 10/30/00 |
| 9803/012 | B | 3/20/99 |
| N/A | A | 9/6/94 |
| N/A | - | 4/8/94 |
| ECO # | REV. | DATE |

| | |
|--|---|
| UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES TOLERANCES: X.X = ±0.1 X.XX = ±0.01 X.XXX = ±0.005 | DRAWING DATE 4/8/94 DRAFTER DAP APPROVED SES |
| FINISH: N/A | FILE NAME 8900EJ.DWG |
| MATERIAL: N/A | DIRECTORY 8900 |
| NOT TO SCALE | SHEET 20F 3 |



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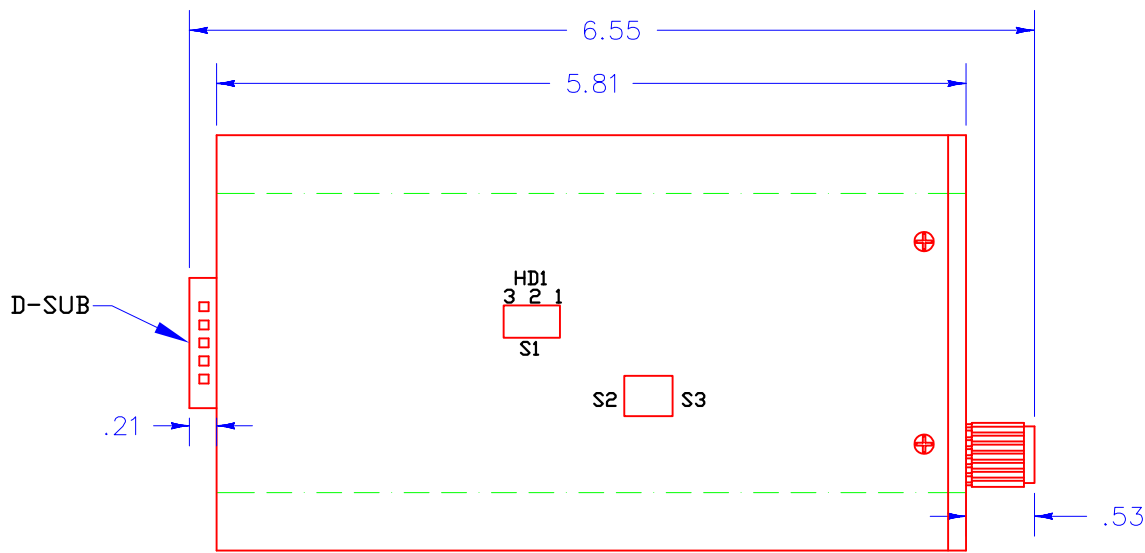
DRAWING NO. 4089-026

SIZE A

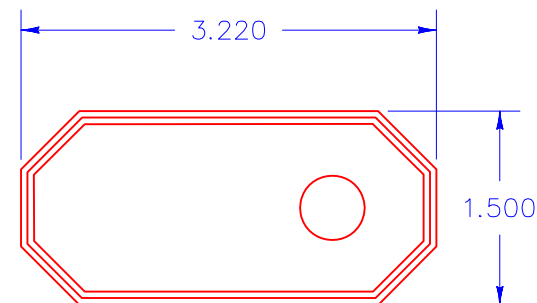
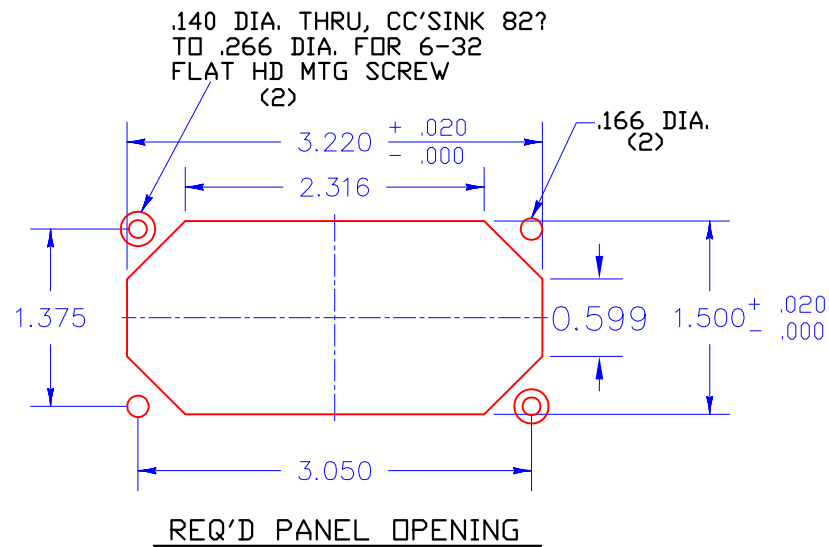
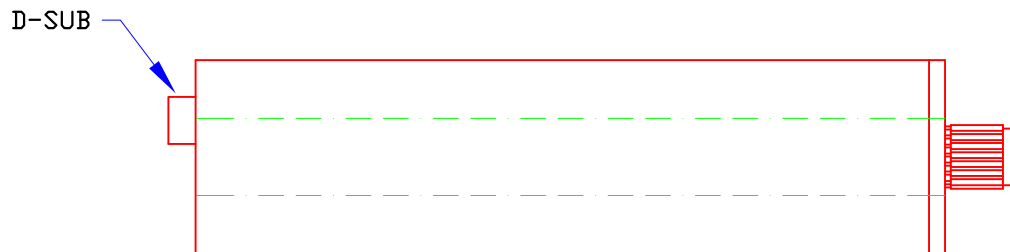
INSTALLATION,
ALTITUDE
MANAGEMENT
SYSTEM

P/N 8900

REV D



BOTTOM VIEW
ALTITUDE MANAGEMENT SYSTEM



| PULL-UP CONFIGURATION | | |
|-----------------------|--------|--------|
| PULL-UP SIG | S1 | S2 |
| INTERNAL | CLOSED | CLOSED |
| EXTERNAL | OPEN | OPEN |
| W/O TRANSPONDERS | CLOSED | CLOSED |

| SERIAL INPUT SELECT | |
|---------------------|--------|
| TYPE OF INPUT | S3 |
| GRAY CODE INPUT | OPEN |
| SERIAL DATA INPUT | CLOSED |

| GRAY CODE LINE D4 SELECT (ALTITUDES ABOVE 30,700 FT) | |
|---|-------|
| D4 LINE | HD1 |
| D4 ENABLED | 1 - 3 |
| D4 DISABLED | 1 - 2 |

INSTALLATION, ALTITUDE
MANAGEMENT SYSTEM

| ECO # | REV. | DATE |
|----------|------|----------|
| 0504/026 | D | 9/8/05 |
| 0010/033 | C | 10/30/00 |
| 9803/012 | B | 3/20/99 |
| N/A | A | 9/6/94 |
| N/A | - | 3/8/94 |

| | | |
|--|-----|-------------------------|
| UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES | | DRAWING DATE 3/8/94 |
| TOLERANCES: X.X = ±0.1 X.XX = ±0.01 X.XXX = ±0.005 | | DRAFTER DAP |
| FINISH: | N/A | APPROVED SES |
| MATERIAL: | N/A | FILE NAME 8900EJ.DWG |
| SCALE: NONE | | DIRECTORY 8900 |
| | | SHEET 30F 3 |



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DRAWING NO.
4089-024

SIZE
A

P/N 8900

REV
D

INSTALLATION,
ALTITUDE
MANAGEMENT
SYSTEM

Report: 4089
 Date: January 20, 1997
 Rev: A
 Sec.: IX
 Page 1 of 1

Shadin
 File Name: IK8900AP.DOC
 DIRECTORY: IKXXXX
 ECO # 9701/016
 ECO date: 2-20-97
 Approved: PG

PARTS LIST

Part #: **IK8900**

Drawing #: N/A

Description: **INSTALL KIT ALT MANAGEMENT SYSTEM**

| <u>FN</u> | <u>P/N</u> | <u>QTY.</u> | <u>DESCRIPTION</u> | <u>MFG.</u> | <u>MFG.#</u> | <u>DESIGNATION</u> | <u>COMMENTS</u> |
|-----------|------------|-------------|--|-------------|--------------|--------------------|-----------------|
| 5 | 230036 | 1 | CONN, 15 pin D-Sub Female | | | | |
| 10 | 230038 | 1 | CONN, Hood 15 pin D-Sub | | DA-24658 | | |
| 15 | 511002 | 2 | SCREW, 4-40 x 1/4 RH, Phil, Pan, ss | | | | |
| 20 | 512101 | 2 | Retainer Clip, "Bow Tie" Style | | | | |
| 25 | 541001 | 2 | WASHER, #4 split lock ss | | | | |
| 30 | 544102 | 1 | CLAMP, 1/2 3ATI, MSP# 64419B | | | | |
| 35 | PK1001 | 1 | BAG, 2.5 x 3 x 4 Mil Zip Lock | HAL | SHAD9002 | | |

10 items