



AMS 2000, ALTITUDE ALERT SYSTEM

PRODUCT P/N: 8900

INSTALLATION MANUAL

REV M

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MANUAL P/N: IN8900A

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<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

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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.

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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.

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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"

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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.

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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

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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.

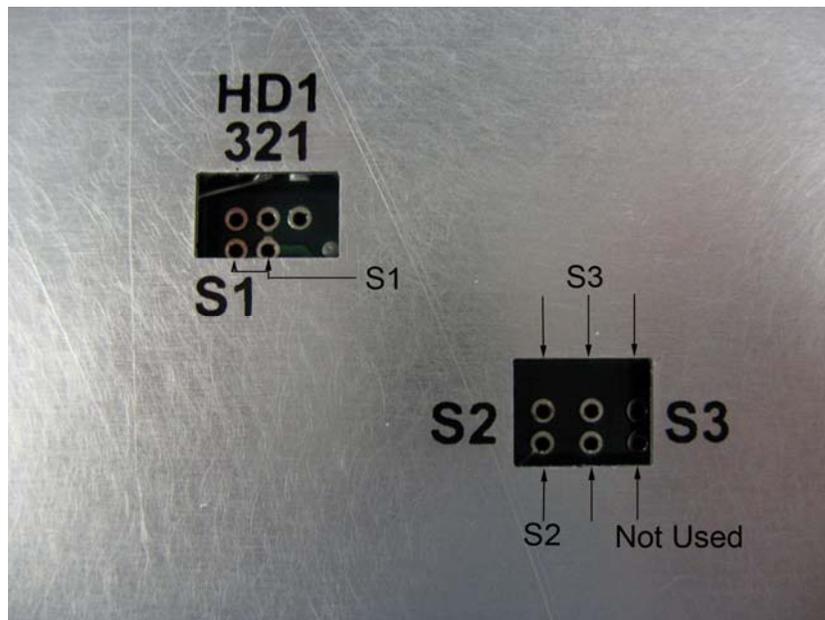


Figure 2-1. S3 Jumper Location for Gray Code

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.

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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.

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3. ENVIRONMENTAL QUALIFICATION FORM

RTCA/DO-160B Certification

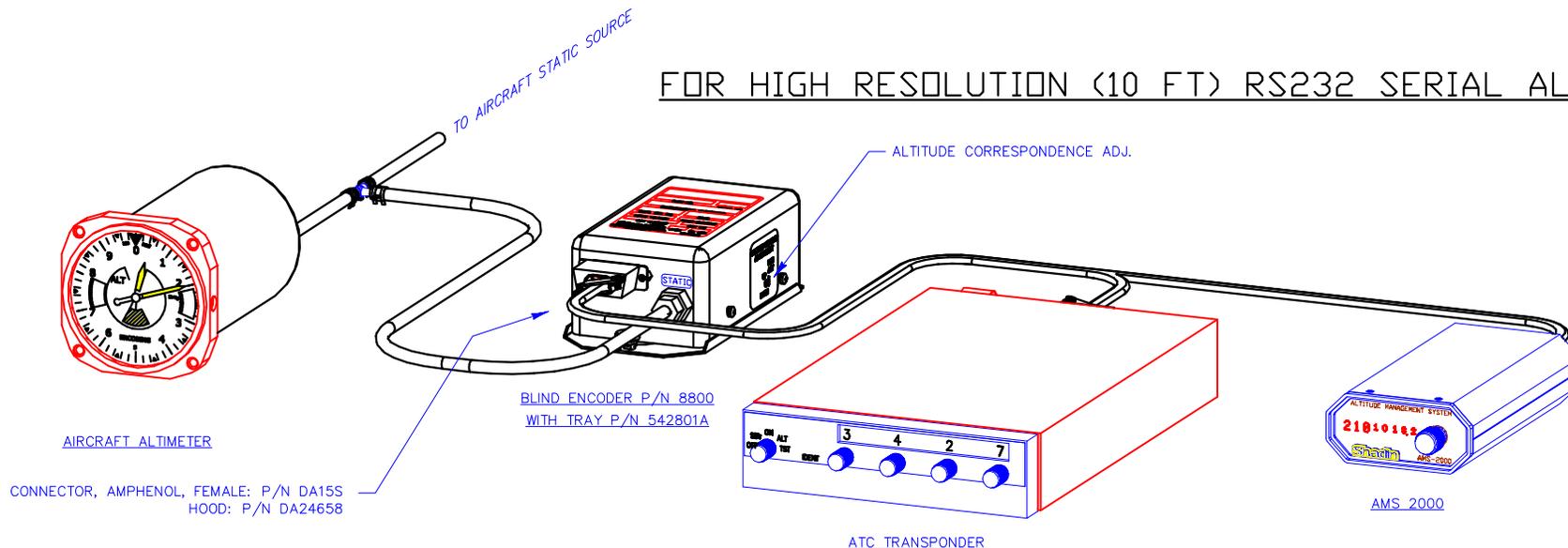
<u>Conditions</u>	<u>Section No.</u>	<u>Categories</u>
Temperature & Altitude	4	C1
Temperature Variation	5	C
Humidity	6	A
Operational Shocks	7	-
Vibration	8	P, K, S
Explosion Proofness	9	X
Waterproofness	10	X
Fluids Susceptibility	11	X
Sand & Dust	12	X
Fungus Resistance	13	X
Salt Spray	14	X
Magnetic 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

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SECTION 4.

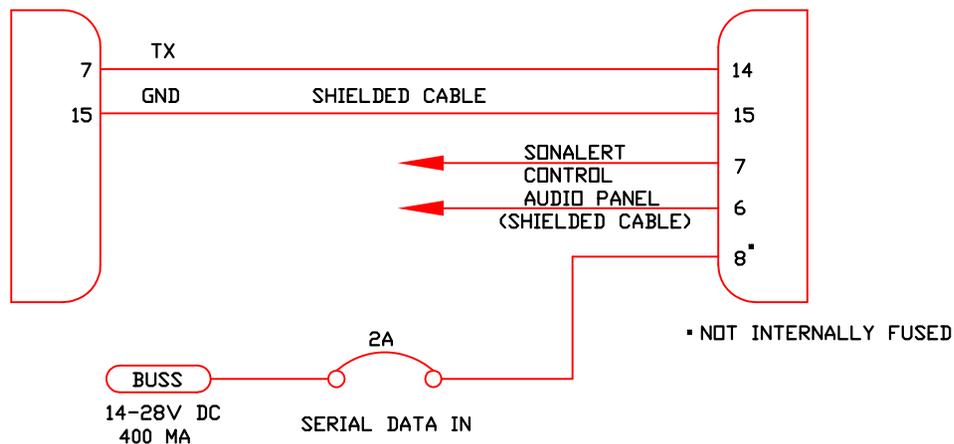
**INSTALLATION DRAWINGS AND
INSTALL KIT PARTS LISTS**

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	

ECO #	REV.	DATE	BY	APP'D	DESCRIPTION
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

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



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

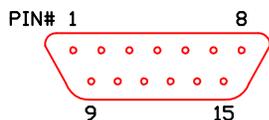
PULL-UP CONFIGURATION		
PULL-UP SIG	S1	S2
INTERNAL	CLOSED	CLOSED
EXTERNAL	OPEN	OPEN
W/O TRANSPONDERS	CLOSED	CLOSED

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

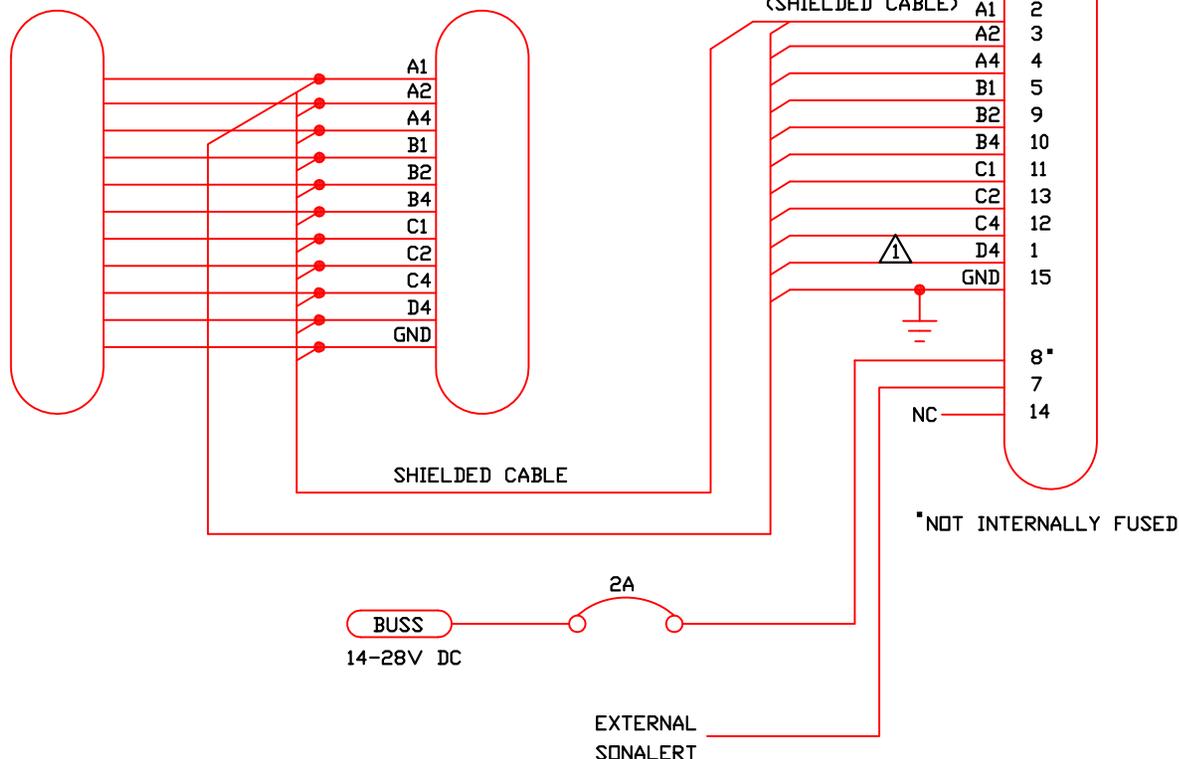
CONNECTOR PIN ARRANGEMENT



(VIEWED FROM SOLDER SIDE OF FEMALE CONNECTOR)

GENERIC MODE C
ALTITUDE
ENCODER

ATC
TRANSPONDER



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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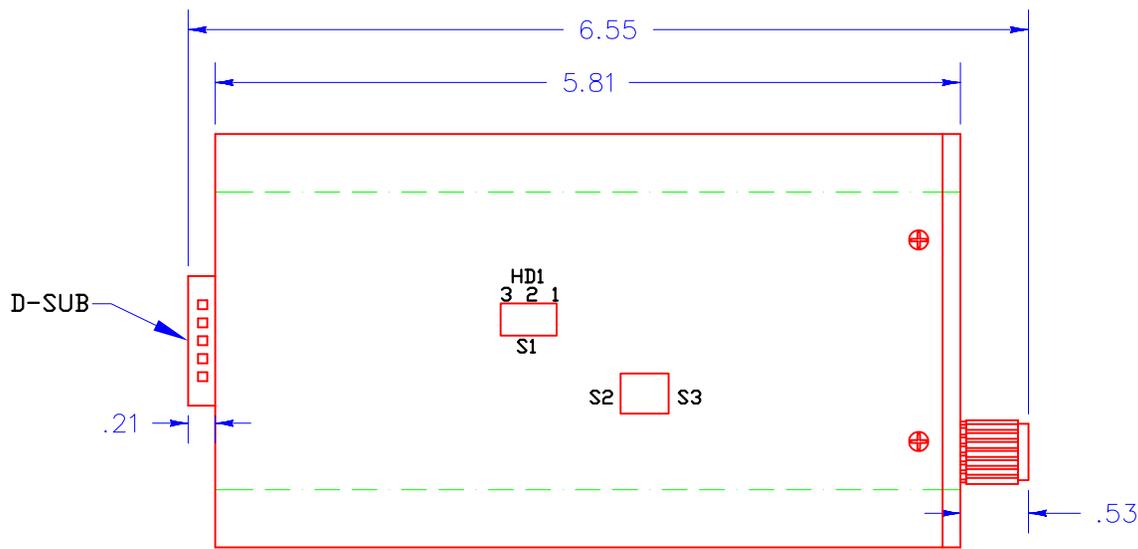
DRAWING NO. 4089-026

SIZE A

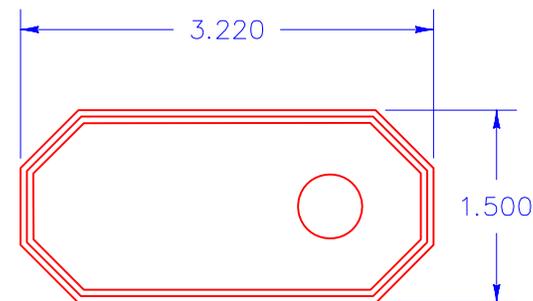
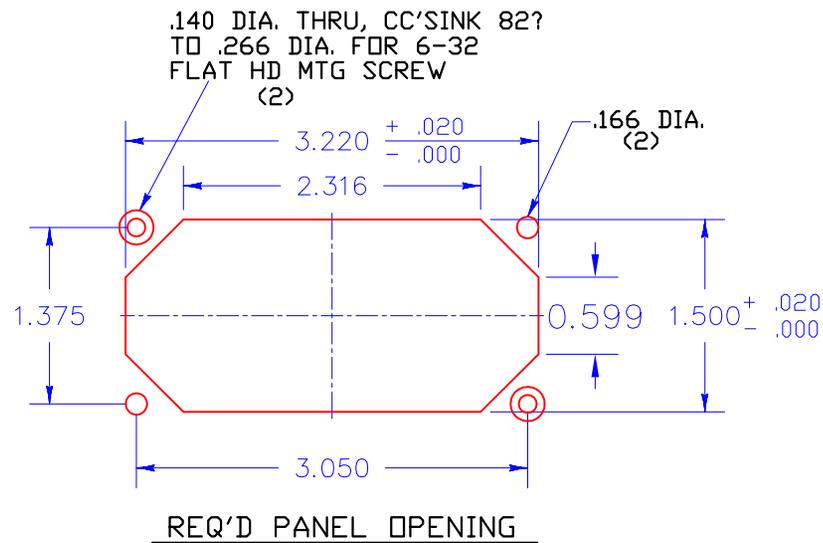
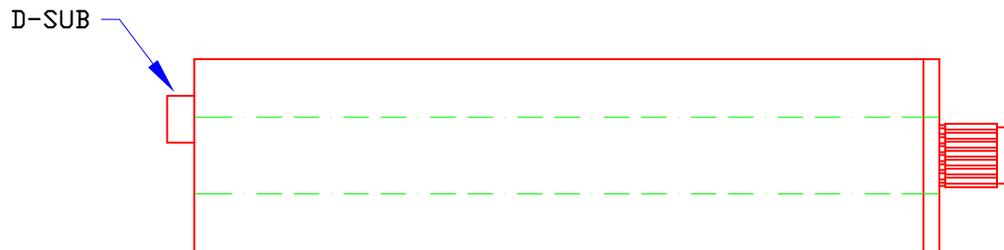
INSTALLATION,
ALTITUDE
MANAGEMENT
SYSTEM

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



INSTALLATION,
ALTITUDE
MANAGEMENT
SYSTEM

DRAWING NO.
4089-024

SIZE
A

P/N 8900

REV
D

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