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# AFFORDABLE INNOVATIONS

## **ACCESSIBLE SAFETY STC**

# Dynon EFIS-D10A/D100

## **STC SA04075CH - Installation Manual**

**Document Number: TJJ-MAN-02**

**Rev. A**

**Date: 2 August, 2016**

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## Record of Revisions

<b>Revision</b>	<b>Revision Date</b>	<b>Description</b>	<b>APPROVED</b>
A	8/2/16	Initial Release	

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# 1 GENERAL DESCRIPTION

## 1.1 Introduction

This manual provides information about the physical, electrical, and plumbing installation of the EFIS-D10A or D100, EDC-D10A, GPS-251, OAT probe, backup battery, and AOA probe purchased from Dynon Avionics. Additionally, this guide deals with setting up the installation-dependent firmware options. Because you may not be installing all components, you need only read through the relevant sections of this guide. Information about the *operation* of this instrument can be found in the EFIS-D10A/D100 Pilot's User Guide. Not all functions described in the pilots guide are allowed under the limits of the STC.

## 1.2 Scope

This installation manual applies to the modification of an aircraft under STC SA04075CH to install the equipment described in the table below.

Part #	Description	STC Requirements
100538-000	Dynon EFIS-D10A System, Retail (Includes EFIS-D10A, 100321-000; Mounting Accessories, 100351-000; Short 7/64 Hex Wrench, 100556-000)	Mandatory
100534-001	EFIS-D100 with Super-Bright Screen, Instrument only, Retail (Includes Instrument, 100488-001; 7/64 Hex Wrench, 100556-000)	Alternate replacement for EFIS-D10A
100096-000	Dynon Internal Backup Battery for D10/D100 Series	Mandatory
102827-000	Dynon GPS-251 GPS Receiver/Antenna Module for D10/D100 Series	Mandatory
100323-000	Dynon EDC-D10A Remote Compass	Optional
100433-001	Dynon OAT Probe for D10/D100 Series (requires EDC-D10A)	Optional
100141-000	Dynon AOA Probe, Unheated	Optional
102832-000	Dynon Simplified Wiring Harness for D10/D100 Series w/ GPS-251 support	Optional
100422-000	D100 Series Mounting Tray	Required for D100 Installation
100024-000	D10 Series Flush Mount Bracket	Optional

Dynon EFIS-D100 is an approved substitution for the EFIS-D10A currently included in the Dynon EFIS-D10A EAA Sales Kit 102778-000. Please consider dimensional constraints before making a decision on which EFIS to install.

*The Airworthiness Limitations Section is FAA approved and specifies maintenance required under 14 CFR §§ 43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved. The following limitations apply to installations approved by STC SA04075CH:*

### **1.3 Warning**

Dynon Avionics' products incorporate a variety of precise, calibrated electronics. Except for installing and replacing the mandatory internal backup battery per this guide, these products do not contain any field/user-serviceable parts. Units that have been found to have been taken apart may not be eligible for repair under warranty. Additionally, once a Dynon Avionics EFIS-D10A/D100 or any accessory is disassembled, it requires factory calibration to return to operating specifications.

### **1.4 About this Guide**

In the electronic (.PDF) version of this manual, page and section references in the Table of Contents and elsewhere act as hyperlinks taking you to the relevant location in the manual.

### **1.5 Menu Descriptions**

Throughout this guide, the ">" character is used to indicate entering a deeper level of the menu system. For example, "EFIS > SETUP > VRSION" indicates entering the EFIS menu, pressing MORE, then pressing SETUP, and then pressing VRSION to enter the firmware version menu. Note that the MORE button is not shown in the sequence, since pressing MORE reveals more options in the same level of the menu system.

## 2 INSTALLATION OVERVIEW

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### 2.1 Install Checklist

To install a Dynon EFIS-D10A/D100 in an aircraft, the following steps must be completed:

- Connect to properly current protected source of switched aircraft power using purchased or created wire harness
- Install GPS-251 Receiver/Antenna and run wires to panel
- Install optional remote compass (EDC-D10A) and run harness wiring to EDC
- Install optional AOA probe and plumbing to panel
- Install optional OAT probe
- Install backup battery
- Connect pitot and static ports to aircraft system
- Install optional mounting tray/flush mount bracket
- Install Dynon EFIS-D10A/D100 in panel
- Configure pitch angle, calibrate remote compass, calibrate pitot sensors, and set airspeed colors per aircraft POH

**!** CHAPTER 3, INSTALLATION PROCEDURE, FOLLOWS THE STRUCTURE AND ORDER OF THIS CHECKLIST. MAKE SURE ALL BOXES LISTED ABOVE ARE COMPLETE BEFORE FINISHING THE INSTALLATION

### 2.2 Recommended Wiring Practices

The Dynon harness is made up of 22 AWG wire and meets Mil Standard MIL-W-22759/16 (Tefzel insulation).

All connections on the EFIS-D10A/D100 female 25-pin harness are described in the Pin Assignment for Female 25-Pin Harness section on page 2-3.

Wiring should be installed in accordance with AC 43.13-1B Chapter 11, sections 8 through 13. The following issues should be addressed:

**!** DO NOT MAKE CONNECTIONS WHILE POWER IS APPLIED AT ANY POINT IN THE SYSTEM.

It should not be possible for the cable harness to be exposed to wire chafing;

- The cable harness should not be located near flight control cables, high capacity electrical lines (e.g. DC electric motor cables) or fuel lines;
- The cable harness should be located in a protected area of the aircraft; and
- Do not route cable near high-energy sources. (i.e. DC motors, high heat sources)
- Pigtail lengths must be less than 3.0 inches.

## 2.3 Power Requirements

The Dynon Display system-wide power requirement is **13 watts** typical and **17 watts** maximum. On a 12-volt system, this translates to about 1.5 amps of maximum current draw. On a 24-volt system, this translates to about 0.75 amps maximum current draw. Normally, a 3-amp circuit breaker or fuse is sufficient.

Power is fed to Dynon Display via pins in the female D-25 connector as shown on the 25-Pin Female EFIS-D10A/D100 Harness diagram on page 2-3.

## 2.4 25-Pin Female EFIS-D10A/D100 Harness

Below is the wiring diagram of the EFIS-D10A/D100 25-pin female harness. If you are using the harness manufactured by Dynon Avionics, it is color coded according to the chart on the following page. Unless noted otherwise, all wires are 3 feet long on the Dynon-provided harness.

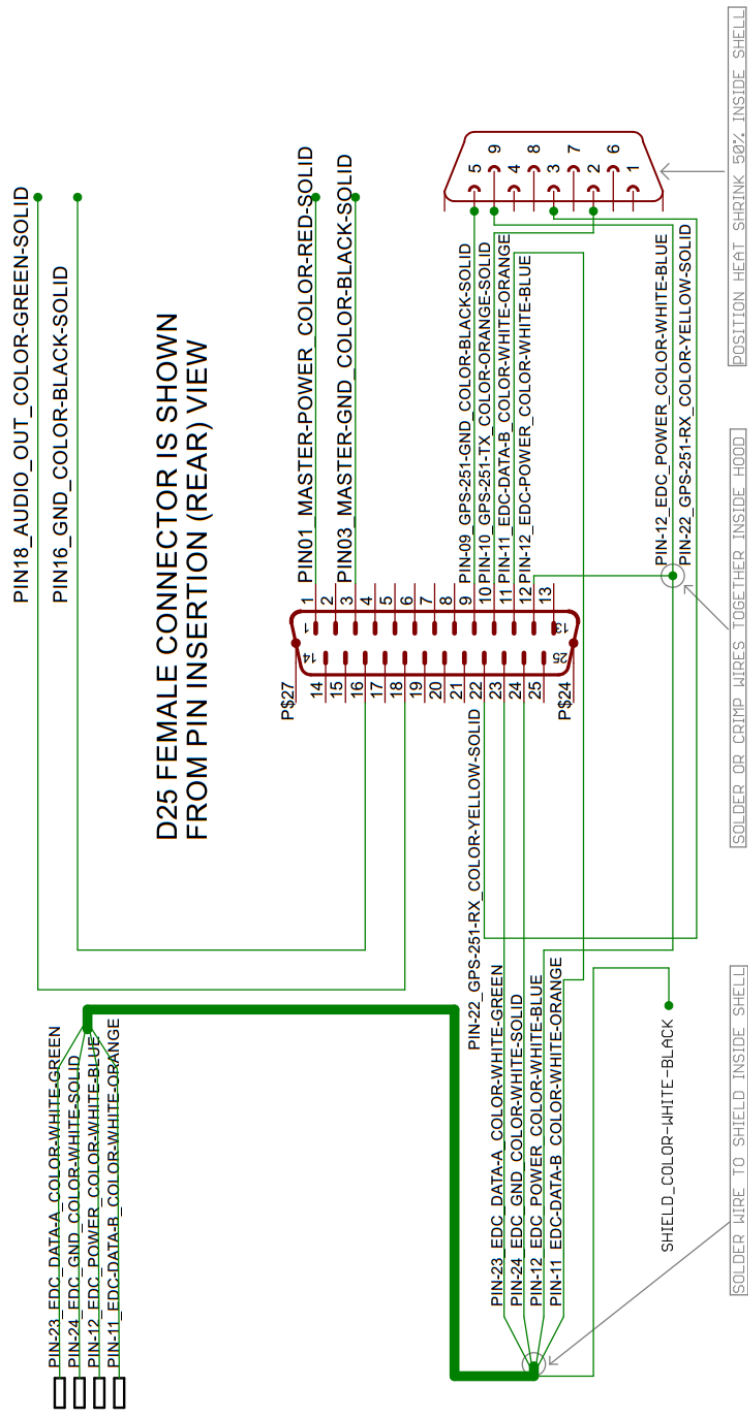


Figure 2-1 25-Pin Female Harness



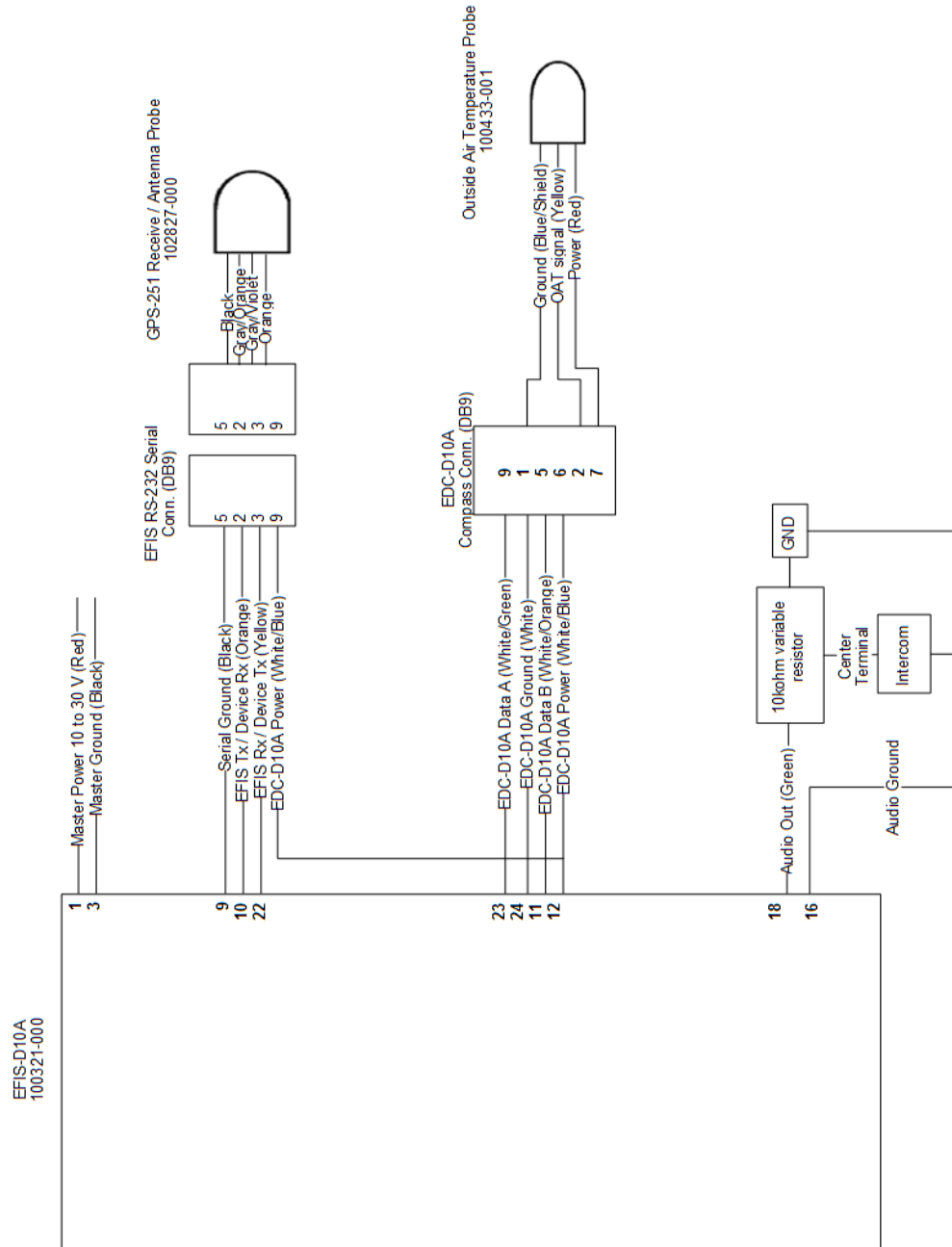
The pin assignments for the female 25-pin harness are repeated below. *Note that the pin numbers are labeled on the face of both the female and male connector.* Each connection on the harness supplied by Dynon is color-coded. These colors are listed in the following chart.

**Table 2-1 Pin Assignment for Female 25-Pin Harness**

<b>Female DB25 Pin #</b>	<b>Dynon Harness Wire Color</b>	<b>Function</b>	<b>Details</b>
1	Red	Master Power (10-30 volts)	Page 3-1
3	Black	Master Ground	Page 3-1
9	Black	GPS-251-GND	Page 3-3
10	Orange	GPS-251-TX	Page 3-3
11	White/Orange	EDC-D10A Data B	Page 3-4
12	White/Blue	EDC-D10A and GPS-251 Power (12V)	Page 3-3 Page 3-4
16	Black	Audio Ground	Page 3-153-13
18	Green	Audio out	Page 3-15
22	Yellow	GPS-251-RX	Page 3-3
23	White/Green	EDC-D10A Data A	Page 3-4
24	White	EDC-D10A GND	Page 3-4

**2.1.1 WIRING SYSTEM OVERVIEW**

The following block diagram depicts the basic layout of the DB25 electrical connections and is for reference only. Read the specific instructions for each connection prior to installation. The colors shown refer to the Dynon-supplied harness.



**Figure 2-2 - EFIS-D10A/D100 wiring diagram**

### 3 INSTALLATION PROCEDURE

This section provides you with the information needed to physically and electrically install the EFIS-D10A.

#### 3.1 Power Inputs

The EFIS-D10A has a single power input, located on the DB25 connector.

Table 3-1 Pin Assignments for Power Inputs

EFIS DB25 pin#	Function	EFIS DB25 wire color	Description
1	Master Power	Red	Provides primary power to the instrument. The EFIS-D10A will switch on upon application of power. Connect to a switched power source. Will not be adversely affected by engine cranking.
3	Master Ground	Black	Connect to ground. Must carry as much as 2 amps.

#### 3.2 GPS-251 Receiver/Antenna Installation

##### 3.2.1 GPS-251 INSTALLATION INTRODUCTION



This chapter contains information that specifically applies to the installation of the Dynon Avionics GPS-251 GPS Receiver/Antenna. After reading this chapter, you should be able to determine how to prepare the installation location, mount the unit, and connect the unit to the Dynon EFIS-D10A/D100.

The GPS-251 is a self-contained GPS receiver/antenna intended for use with the Dynon Avionics EFIS system. Unlike similar-looking GPS units, the electronics of the GPS are contained within the unit – there is no separate “electronics module” requiring a coaxial cable connection. The four 22 AWG wires provide power and ground, and data to the unit. The GPS-251 is powered by the display. In this application, the GPS signal is used to back up the attitude solution if the pitot system fails.

### 3.2.2 GPS PHYSICAL INSTALLATION

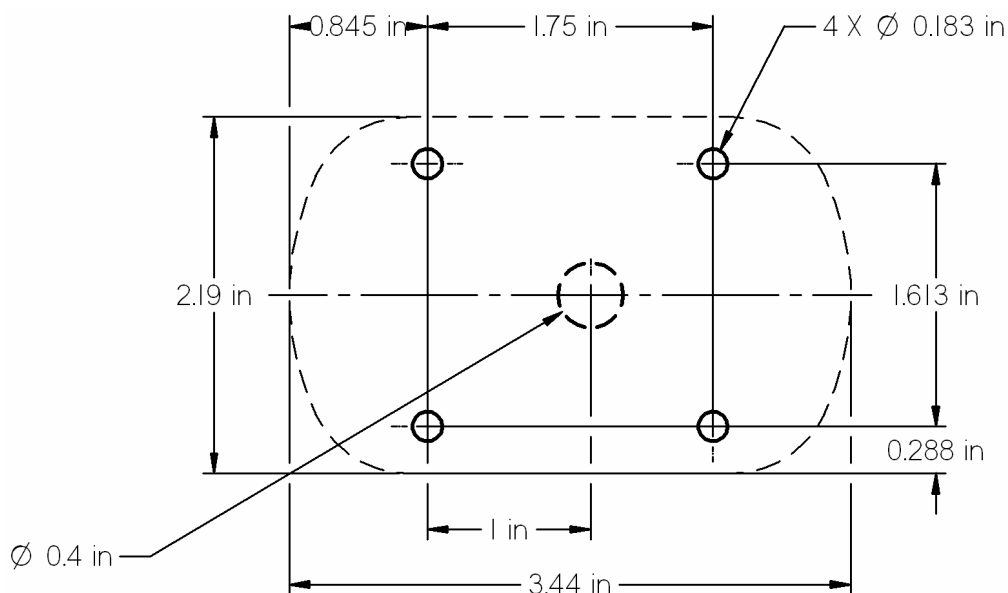


Like all GPS devices, for most reliable performance, the GPS-251 requires a clear, unobstructed “view” of the sky. The GPS-251 is designed to be mounted on the upper fuselage of the aircraft for an unobstructed (360° view) of the sky during maneuvers. If the GPS-251 is mounted inside the fuselage (for example, on the top of the panel or underneath a cowling), the GPS-251 view of the sky may be partially or fully obstructed and GPS performance may be marginal.

Observe the following guidelines when choosing a location for a GPS-251:

- The optimal location for the GPS-251 is a rigid surface on the upper fuselage of the aircraft.
- Mounting location should be relatively level.
- Do not locate the receiver within 3 feet of transmitting Receiver/Antennas or other GPS Receiver/Antennas.
- Avoid Receiver/Antenna shadows (i.e., obstructions that block the Receiver/Antenna’s view of the sky).

The diagram below shows the mounting dimensions of the GPS-251. Note that it utilizes a common bolt pattern found in much of general aviation.



**Figure 3-1 – GPS-251 Mounting Dimensions**

The GPS-251 is designed to be installed with #8 fasteners that have 100 degree countersunk heads. The use of nut plates is recommended for convenience, but other hardware can be used if space allows. Specific hardware selection is determined by the installer. Note that no mounting hardware is included with the GPS-251.

We recommend the use of weather sealant around the fastener heads to keep moisture from entering the aircraft through the mounting holes. For extra protection, you may use weather sealant around the outside of the Receiver/Antenna where it meets the skin of the aircraft.

### 3.2.3 GPS-251 ELECTRICAL CONNECTION

The GPS-251 is shipped with a DB9 connector kit. Strip the wires on the GPS-251, crimp male D-sub pins onto wires, and install into connector according to the table below. Plug this into the matching connector on the wiring harness for the Dynon EFIS-D10A/D100. No additional configuration is required.

**Table 3-2 Pin Assignment for GPS-251 connector**

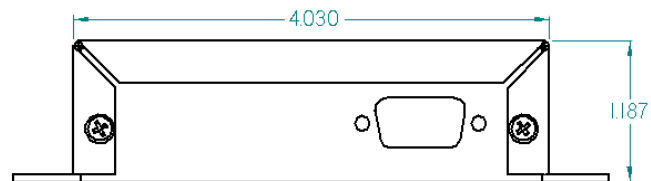
EFIS DB25 pin#	GPS-251 DB9 pin#	Function	Wire color
22	2	GPS-251 Tx	Gray/Orange
10	3	GPS-251 Rx	Gray/Violet
9	5	GPS-251 Ground	Black
12	9	GPS-251 Power	Orange

## 3.3 Installing the EDC-D10A Remote Compass

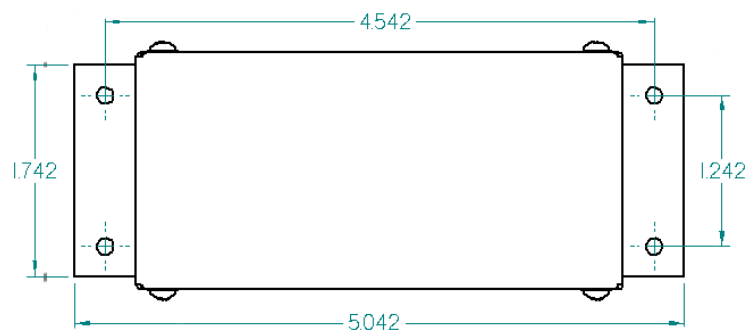
Finding a good location for the EDC- D10A remote compass module is critical to an accurate EFIS-D10A heading display. Keep in mind that calibration can compensate for small static magnetic fields superimposed upon the earth's field; it cannot take into account dynamic effects like AC currents, non-constant DC currents and non-stationary ferrous material (e.g., an electric turn coordinator). Use the following suggestions to help you find a good location for your EDC-D10A.

Keep the EDC- D10A away from any source of magnetic fields (such as electrical equipment and current-carrying wires) and ferrous material.

Move a handheld compass throughout the space surrounding your location to get a rough idea of the suitability of your chosen location. If the needle deviates significantly from magnetic north in any given area, that location would not be ideal for the EDC-D10A.



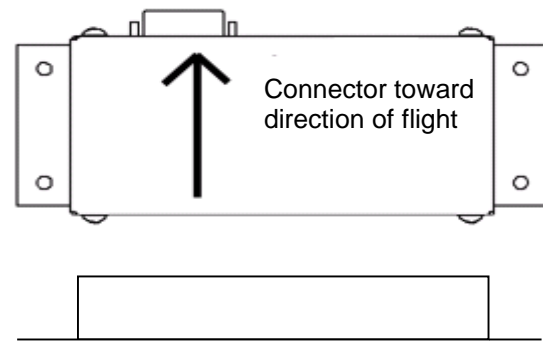
**Figure 3-2 EDC-D10A Dimension**



**Figure 3-3 EDC-D10A Dimension**

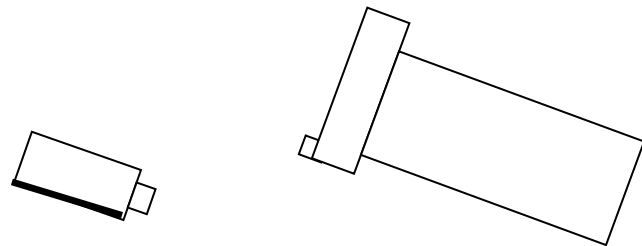
The EDC- D10A can be mounted anywhere in the aircraft (away from magnetic interference) such that its pitch is as close to that of the EFIS-D10A as possible. It should be mounted with the long axis parallel to the wings, the electrical connector facing toward the front of the plane, and the mounting tabs on the bottom. The bracket used to hold the EDC- D10A must hold the EDC-D10A at the same pitch, roll, and yaw as the EFIS-D10A with respect to the airframe. We recommend that you use an electronic level, if available, to make sure the EDC-D10A is aligned with the EFIS-D10A to better than 1 degree.

All mounting hardware needs to be made from non-ferrous material such as aluminum, plastic, or brass. Many stainless steel screws are magnetic. If the item is attracted to a magnet, it should not be used in the installation. The EDC-D10A needs to be mounted in a location as free from magnetic interference as possible. This means keeping the EDC- D10A away from any ferrous nuts, bolts, and screws, aircraft tubing, as well as from wires or devices carrying any appreciable current such as strobe light wiring, autopilot servos, or other electronics.



**Connector forward and tabs mounted down**

**Figure 3-4 EDC-D10A Installation Orientation**



**Figure 3-5 Side View of EDC-D10A, Tabs Mounted Down and Aligned Within 1 Degree of Pitch with EFIS-D10A or EFIS-D100**

### 3.3.1 EDC-D10A COMMUNICATION CABLE

- ⚠ DO NOT ATTEMPT TO POWER UP THE EFIS-D10A WITH THE EDC CABLE LEADS EXPOSED (UNSHEATHED) AND NOT INSTALLED IN THE DB9 CONNECTOR. SHORTING THESE CONNECTIONS WILL CAUSE DAMAGE TO THE UNIT.

Like the RS-232 PC Communication cable, the EDC- D10A/D100 communications cable terminates in a standard female DB9 connector. While they look similar, do *not* plug the EDC cable into a PC or vice versa. The following table outlines the four connections that must be made to ensure proper communication between the EFIS-D10A and the EDC-D10A remote compass module. The Dynon-supplied harness colors are listed, as well.

**Table 3-3 Pin Assignment for EDC-D10A Cable**

EFIS DB25 pin#	EDC DB9 pin#	Function	Wire color
11	5	EDC Data B	White/Orange
12	6	EDC Power	White/Blue
23	9	EDC Data A	White/Green
24	1	EDC Ground	White

The EDC cable in the harness supplied by Dynon consists of 4 conductors, surrounded by a metal shield and white insulation. These 4 wires are terminated with crimped female D-sub pins wrapped in plastic tubing. If you are building your own cable, we recommend that you use shielded cable as well.

With the 25-pin harness disconnected from the EFIS-D10A/D100, carefully cut or pull the tubing off the 4 D-sub pins. Route the cable to the EDC-D10A mounting location chosen according to the instructions above. Install the female pins in the correct holes on the included DB9 connector, according to the chart above. Install the back shell around the DB9 connector.

The metal shield around the EDC communication cable is connected to the short black/white wire emanating from the DB25. Connect this wire to ground close to the EFIS-D10A, ideally the panel.

### **3.4 AOA Probe Installation**

To ensure accuracy, it is very important that you install the probe correctly and perform the specified calibration steps. We recommend that you read the entire guide before proceeding with the installation.

#### **3.4.1 AOA CALCULATION: PRINCIPLES OF OPERATION**

Dynon Avionics' AOA probe performs the function of sensing angle of attack. These functions require two pressure ports. The existing pitot probe has a pressure port on the front face of the probe and is designed to be insensitive to angle of attack. The second pressure port is located on an angled surface of the Dynon AOA probe, just under the pitot port, and is designed to be very sensitive to AOA. The EFIS-D10A/D100 then uses the difference between these two pressures to calculate the current angle of attack.

#### **3.4.2 TOOLS AND MATERIALS REQUIRED**

- Dynon Avionics AOA probe.
- One plumbing line (usually ¼" soft aluminum or plastic tubing) routed from the EFIS-D10A/D100 to the probe mounting location.
- Tubing interface hardware
- #36 Drill and 6-32 tap
- AOA Probe Mounting bracket.

#### **3.4.3 AOA PROBE MOUNTING**

Please follow these instructions explicitly as improper installation can result in permanent damage to your device and/or aircraft.

The Dynon Avionics AOA probe has been designed as an under-wing AOA probe. The following information applies to this type of installation.

### 3.4.3.1 AOA Probe Mount Location

The Dynon Avionics AoA probe must be mounted on an inspection plate. The AoA probe should be mounted on the inspection plate which is closest to the existing aircraft pitot, as long as that is more than 6" away from the existing pitot. If two inspection plates exist, the one farther out from the airframe is preferable. Make sure that the inspection plate chosen is not in the prop wash.

### 3.4.3.2 AOA Probe Mounting Instructions

After the mounting location has been determined, mount the AOA Probe mounting kit per the included instructions or fabricate your own mount. In either case, mount the probe securely to the wing such that the body of the probe is horizontal during level flight. Drill and tap mounting holes (#6-32) on the probe to match your mounting bracket. Use caution when drilling the holes, ensuring that you avoid drilling into the pitot and AOA pressure lines. As long as you do not penetrate these lines, you may drill all the way through the outer metal without affecting the probe's waterproofing.

## 3.4.4 DIMENSIONS

### 3.4.4.1 Standard mount

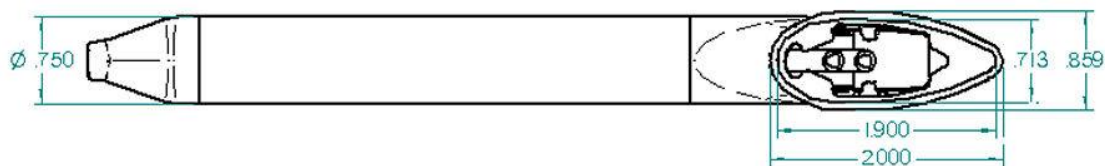


Figure 3-6 AOA Mount Dimensions

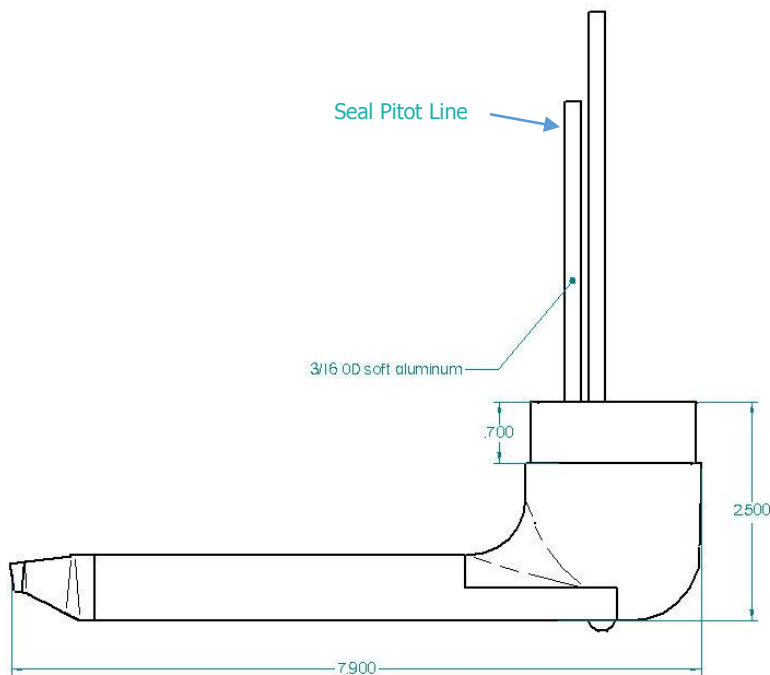


Figure 3-7 AOA Mount Dimensions



### 3.4.5 PLUMBING

**NOTE:** Because the AOA plumbing tube have not been annealed, they work-harden rapidly when manipulated. Make gentle bends, and only bend any given section **once**.

After mounting the probe, route the AOA line from the probe to your EFIS-D10A/D100. The tube **closest to the snout** of the AOA probe is a pitot line which is not used in this application. Seal this line off to prevent water incursion into the wing. The tube in the rear is the AOA line. There is no static source on the Dynon AOA probe.

**!** THE EFIS-D10A/D100 PITOT SOURCE MUST COME FROM THE AIRCRAFTS EXISTING PITOT SYSTEM.

After mounting the probe, install adapters to connect the 3/16 plumbing lines from the probe to whatever plumbing lines run back to the EFIS-D10A/ D100 in your aircraft (AN 919-2D for 3/16 to 1/4). We strongly recommend using aircraft grade fittings such as standard AN fittings. Make sure the plumbing lines do not chafe or interfere with any aircraft control systems.

## 3.5 Dynon OAT Probe Installation

The following instructions provide information on installing and using the OAT probe.

### 3.5.1 TOOLS AND MATERIALS REQUIRED

- Dynon Avionics OAT probe/cable with nylon nut and washer.
- Drill with 3/8" bit
- Dynon Avionics EDC-D10A remote compass module.
- 2 machined D-sub pins
- D-sub pin crimp tool
- Loctite

### 3.5.2 INSTALLATION

#### 3.5.2.1 Mount Location

It is important that the OAT probe be mounted somewhere on the skin of the aircraft where it will not be affected by heat sources (sun, engine, aircraft interior, etc). The ideal location would receive no heat from the aircraft engine or any other source in the aircraft body. While this may be impractical, it is a good idea to mount the probe as far away from heat sources as possible. Common locations include the wingtip and under the horizontal stabilizer. Avoid these four locations:

- Engine exhaust paths
- The engine itself
- Where the sensor will have direct sunlight
- Where the backside is exposed to a heated cabin

### 3.5.2.2 Mounting Instructions

After the mounting location has been determined, drill a 3/8" hole in the skin at the desired location. Uncoil the cable attached to the OAT probe. Remove the nylon nut from the cable. From outside the skin of the aircraft, insert the cable first and then the threaded end of the OAT probe. From within the skin of the aircraft, gently pull the cable until the threaded end of the OAT probe pokes through the hole. Thread the nylon nut down the cable and up to the threaded end of the OAT probe. apply some Loctite around the threads of the OAT probe. Twist the nut onto the threads of the OAT probe and tighten.

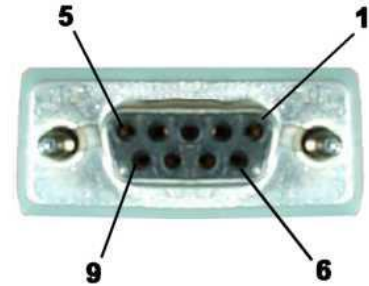
### 3.5.2.3 Wiring Instructions.

Once you have physically mounted the OAT probe, route its attached cable to the EDC-D10A remote magnetic compass module. Your OAT comes with pins crimped on the 3 wires. Insert these 3 wires' pins to the following pin numbers on the DB9 which plugs into the EDC-D10A. The front of the female connector is pictured at right. You will be inserting the pins into the back of this connector.

Pin 2: Yellow wire

Pin 7: Red wire

Pin 8: Blue wire



**Figure 3-8 OAT Probe Wiring Instructions**

The exposed shield wires are not strictly required, but may help OAT performance in noisy environments. If you wish to connect the shield to ground, you may splice it into the blue wire or connect it to the EDC-D10A chassis.

You may lengthen or shorten the connections between the OAT and EDC-D10A. Use the provided crimp connectors on the new wire leads.

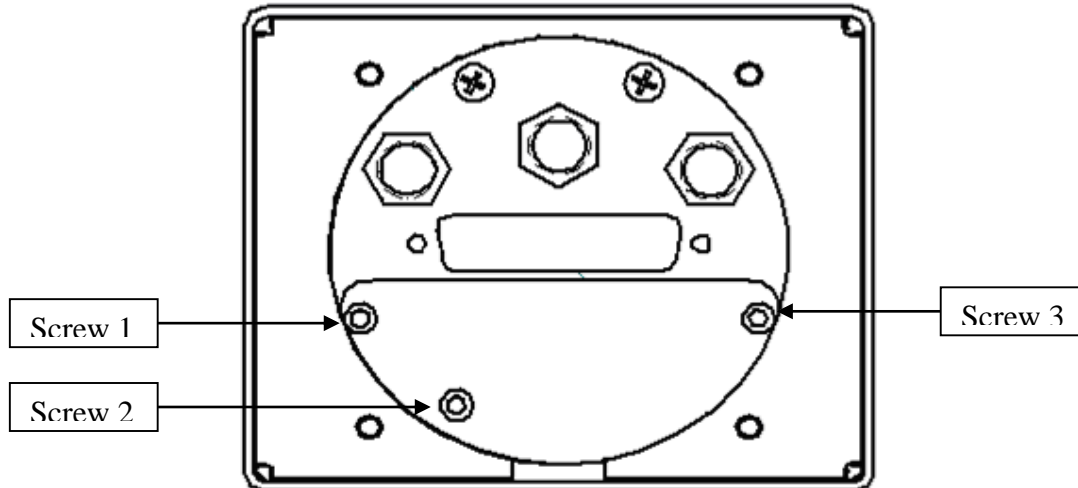
**!** Do not make connections while the EFIS-D10A/D100 is powered on!

### 3.5.3 OAT/TAS/DA DISPLAY

See ICA TASK 34-23-07.

### 3.6 EFIS-D10A Battery Installation

1. Remove the three 7/64" hex screws from the battery door of the Dynon EFIS-D10A. Do not remove the Phillips or D-sub screws.



**Figure 3-9 Battery Pack Installation**

2. Insert the battery with the “bumpy” side up, toward the foam.
3. Connect the battery connector to the battery. The connector is keyed; make sure it is positioned correctly.
4. Position the connector so it is centered on the end of the pack. Verify battery pack is properly centered, not under screw 2.
5. Reinsert screw 2 first and tighten to 12 in-lbs.
6. Caution: Screws 1 and 3 are screwed into the extrusion and are easy to over-torque. Press on the back plate as you insert screws 1 and 3 and tighten 4.5 in-lbs (72 in-ounces).

### 3.7 EFIS-D10A Panel Location and Mounting

The diagram at right shows the outside dimensions of the front bezel of the EFIS-D10A. Note that the instrument is about seven inches deep and the Dynon-made harness extends three inches more. Use the dimensions (in inches) found on the diagram to plan for the space required by the instrument. Take the following considerations into account when selecting a mounting location for the EFIS-D10A.

Avoid placing the instrument near heater vents or any source of extremely hot or cold air. Keep in mind that the air surrounding the EFIS-D10A during operation may be no warmer than 50 °C to ensure accurate operation. Plan a panel location that allows convenient viewing of the instrument with no obstruction. When flying straight and level, the panel angle from vertical may not be greater than +/- 30 degrees. The unit must also be parallel to the roll axis of the aircraft (although not necessarily located along it), and have no significant roll angle in the panel. The firmware supports an adjustment for panel tilt, but not for mounting errors in yaw or roll. Correct attitude performance depends on mounting the EFIS-D10A square with the direction of flight.

You have two options for mounting the EFIS-D10A into your panel: standard or flush. You may use the optional flush-mount bracket, allowing the face of the EFIS-D10A to be flush with your panel. If you opted to receive the flush mount bracket, please skip to Option 2 below. If you opted not to receive this bracket and wish to perform the standard install, follow the options in Option 1 below.

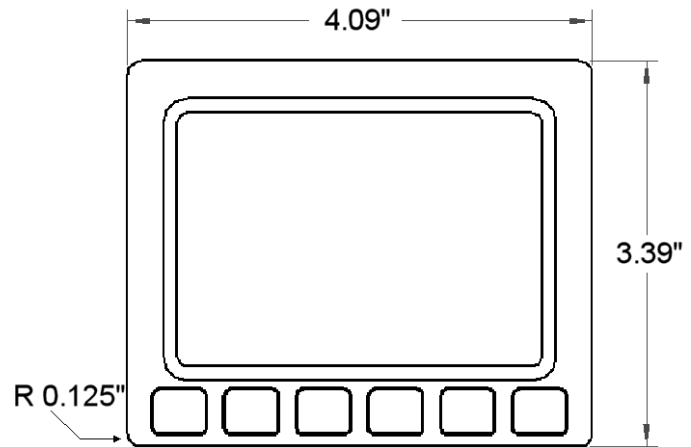


Figure 3-10 Dynon EFIS-D10A Dimension

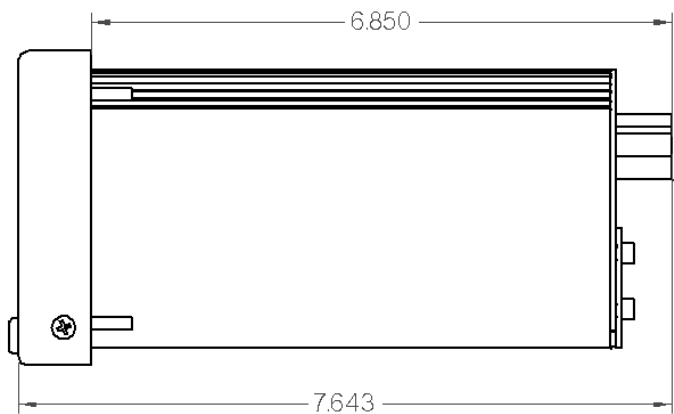


Figure 3-11 Dynon EFIS-D10A Dimensions

### 3.7.1 OPTION 1: NO MOUNTING BRACKET

Using this option, you will be mounting the EFIS-D10A directly into your panel. The front bezel of the unit will extend beyond the plane of your panel by 0.8”.

Installation of the EFIS-D10A main unit should only be completed once all other physical and electrical installations have been performed. This will ensure that last-minute adjustments will not have to be made with the EFIS-D10A mounted in the panel.

The diagram above shows the dimensions expected for the proper installation of the EFIS-D10A into your panel using no mounting bracket. All units are in inches. Push the EFIS-D10A through the main panel hole. The four studs on the back of the EFIS-D10A will fit into the four mounting holes having dimensions listed in the diagram. Place one of the four supplied washers on each stud before pushing the EFIS-D10A into place in the panel, putting the washers in between the EFIS-D10A and the panel. Place one of the 4 supplied mounting nuts on the end of each of the 4 studs protruding from the back of the panel. Secure the nuts tightly against the panel to complete the installation.

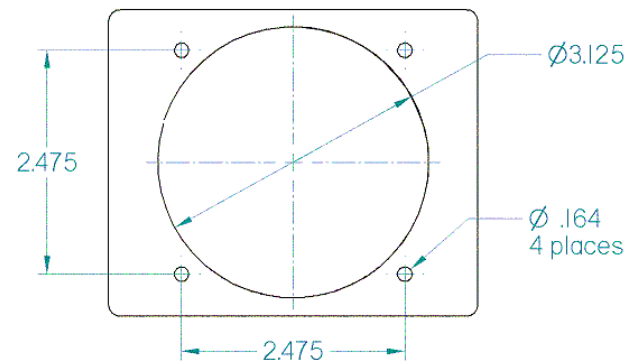


Figure 3-12 Proper Installation Dimensions

### 3.7.2 OPTION 2: FLUSH-MOUNT BRACKET

- ❗ On some installations, the flush mount bracket may have to be modified to fit between adjacent holes.

Make a rectangular cutout in the panel, ensuring that it allows the front panel of the EFIS-D10A to fit. The cutout required should have the dimensions 4.09” wide by 3.39” tall with corner radii of 0.125”. You also need to drill four 0.164” holes in your panel at the four locations shown on the diagram below (two above and two below the rectangular cutout). Install #6 plate nuts on the back side of the bracket. Place one of the supplied washers onto each of the four mounting studs on the EFIS-D10A and then slide the flush mount bracket over the EFIS-D10A. The bracket should wrap around the bezel of the EFIS-D10A. Place one of the 4 supplied nuts on each of the 4 studs and tighten the nuts. The EFIS-D10A/bracket can now be installed from behind your panel using the #6 screws through the previously drilled holes.

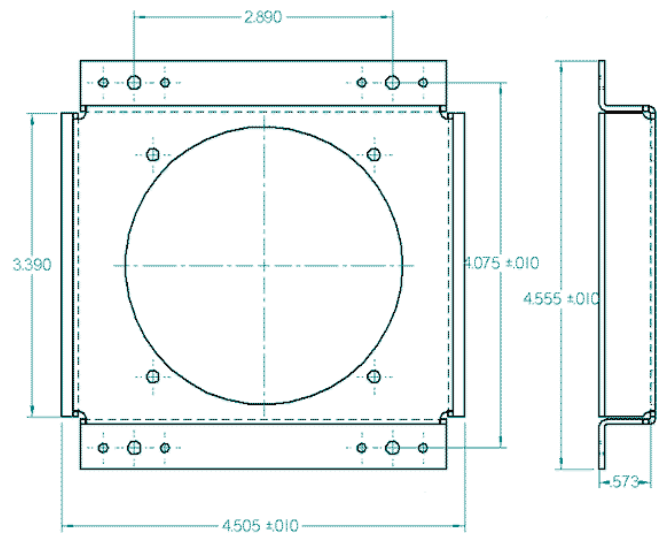


Figure 3-13 Mounting Bracket Dimensions

### 3.8 Connecting Static & Pitot Lines to the EFIS-D10A

The AOA, pitot, and static ports on the back of the EFIS-D10A are equipped with 1/8" NPT Female fittings. To attach your pitot and static lines to the back of the EFIS-D10A, you must use standard 1/8" NPT Male fittings at the end of each of the lines.

Connect your static and pitot sources to the EFIS-D10A, T'ing off of existing lines in the aircraft. The pitot source must come from the existing aircraft pitot, not Dynon's AoA probe. View the following back view diagram the placement of your pressure lines.

*The Dynon D10A attitude calculation requires either airspeed (from pitot and static) or GPS data. To ensure proper operation, both of these data sources must be available. The Dynon D10A must be connected to pitot and static systems in all installations.*

Use two wrenches to both hold the brass fitting on the EFIS-D10A and secure the mating pressure line fittings to the corresponding locations on the back of the EFIS-D10A.

*Do not over-tighten or allow the brass fittings to rotate.*

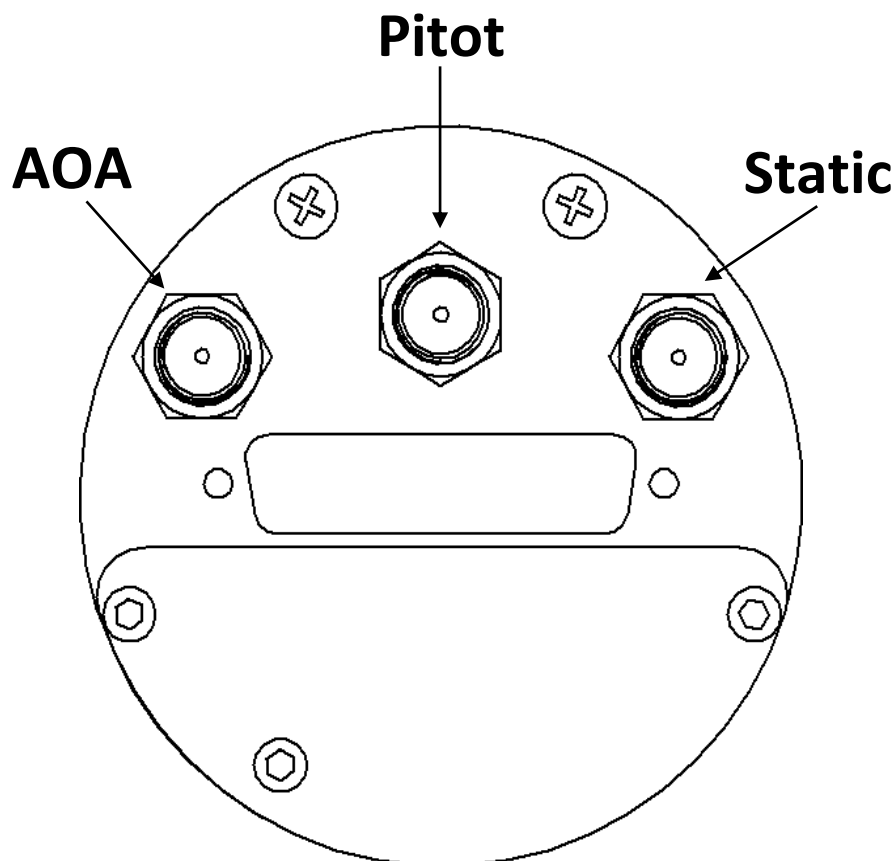


Figure 3-14 AOA, Pitot, and Static Ports

### 3.9 EFIS-D100 Battery Installation

- 1) Remove the two screws (either #1 Phillips or 7/64" hex, depending on when your unit was manufactured) from the small, rectangular battery door on the side of the EFIS-D100. Remove the battery door. Do not remove any other screws from the case of the unit.
- 2) Insert the new battery with the bumpy side up.
- 3) Connect the battery connector to the battery. The connector is keyed; make sure it is positioned correctly.
- 4) Position the connector so it is centered on the end of the pack. Verify that the battery pack will not interfere with insertion of either of the door screws.
- 5) Reinsert screws and tighten to 12 in-lbs.

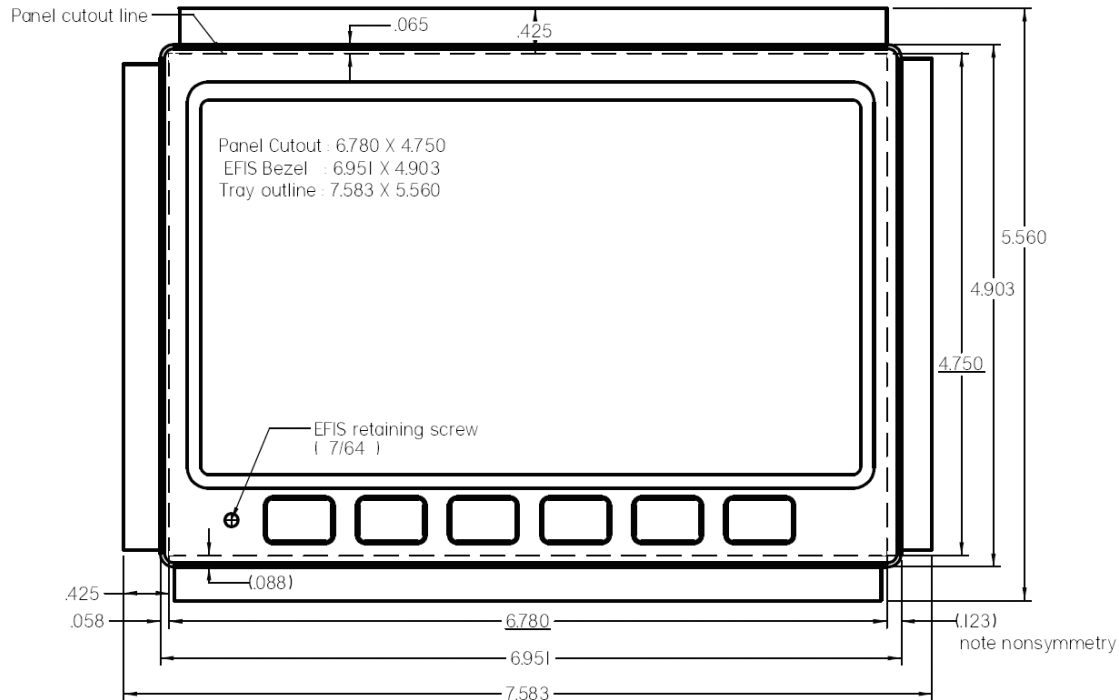
### 3.10 EFIS-D100 Panel Location and Mounting

⚠ The Dynon D100 mounting bracket is required for installing the EFIS-D100.

The diagram below shows the outside dimensions of the front bezel of the EFIS-D100. Note that the instrument and tray extend about 4.5" behind the panel, and the supplied harness extends three inches more. Use the dimensions (in inches) found on the diagram to plan for the space required by the instrument.

The unit must also be parallel to the roll axis of the aircraft (although not necessarily located along it), and have no significant roll angle in the panel. The firmware supports an adjustment for panel tilt, but not for mounting errors in yaw or roll. Correct attitude performance depends on mounting the EFIS-D100 square with the direction of flight.

To mount the EFIS-D100, you must make a rectangular cutout in your panel. Ensure that the dimensions of the cutout are: **6.780" wide and 4.750" tall**. Place the D100-series mounting tray behind the cutout. Secure it to your panel in whatever way you desire. Riveting it to the panel is ideal, but drilling holes for mounting screws and nuts will work as well. You may cut off 2 horizontal or vertical tabs from the mounting tray to minimize the space taken up behind the panel. Upon securing the mounting rack to the back of your panel, slide the EFIS-D100 into it. Use the included 7/64" Allen wrench to secure the mounting screw (at the bottom left of the front bezel) into mounting rack. At your discretion, you can also screw a #6-32 screw into the back of the mounting rack on the opposite side. This screw should penetrate into the instrument no further than 1/4".



**Figure 3-15 Mounting Bracket Dimensions**

### 3.11 Connecting Static & Pitot Lines to the EFIS-D100

The AOA, pitot, and static ports on the back of the EFIS-D100 are equipped with 1/8" NPT Female fittings. To attach your pitot and static lines to the back of the EFIS-D100, you must use standard 1/8" NPT Male fittings at the end of each of the lines.

Connect your static and pitot sources to the EFIS-D100, T'ing off of existing lines in the aircraft. The pitot source must come from the existing aircraft pitot, not the Dynon's AoA probe. View the following back view diagram the placement of your pressure lines.

Use a wrench to secure the mating pressure line fittings to the corresponding locations on the back of the EFIS-D100. Do not over-tighten.

*The EFIS-D100's attitude calculation requires either airspeed (from pitot and static) or GPS data. To ensure proper operation, at least one of these data sources must be available. We recommend the EFIS-D100 be connected to pitot and static systems in all installations.*



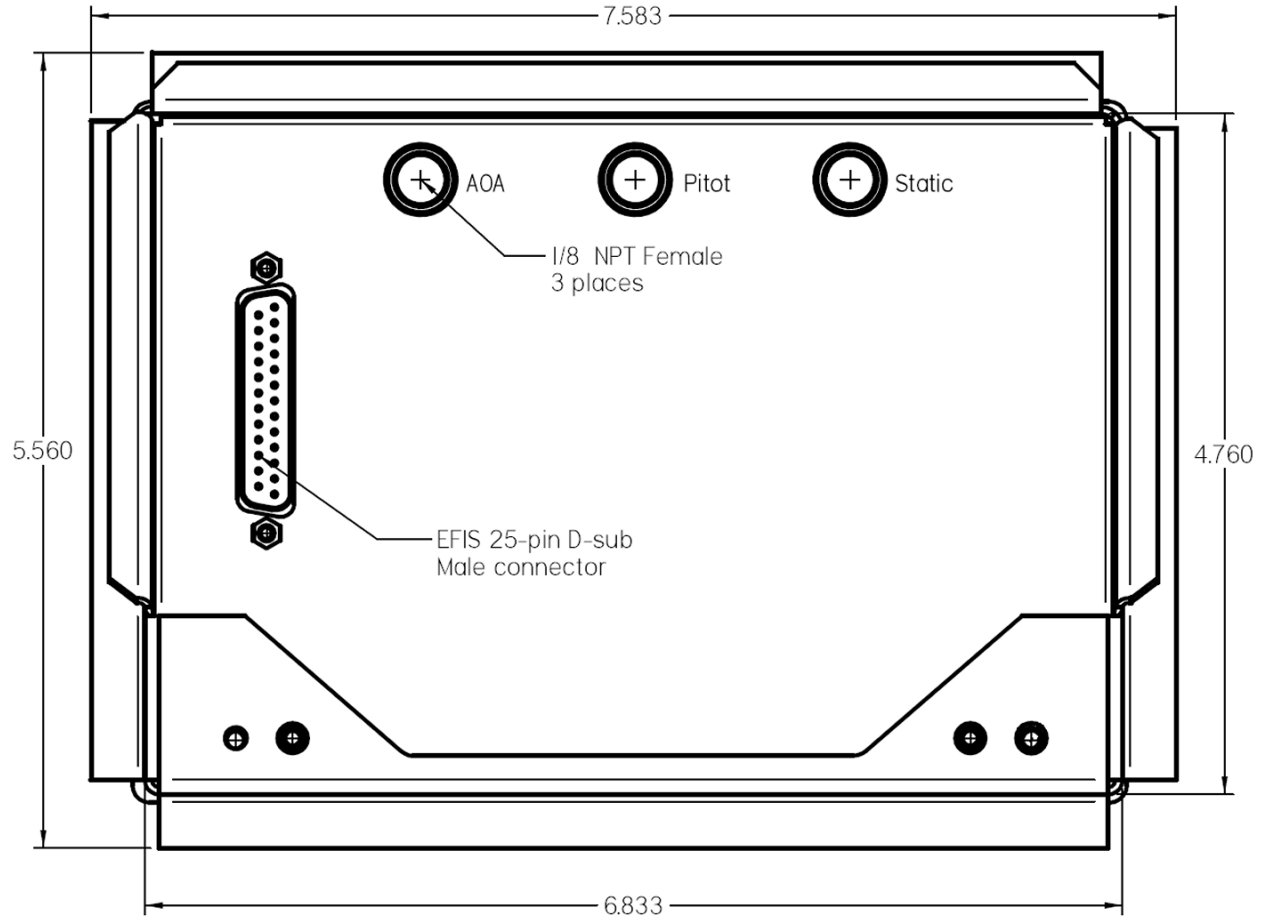


Figure 3-15 AOA/PITOT/STATIC Locations on D100

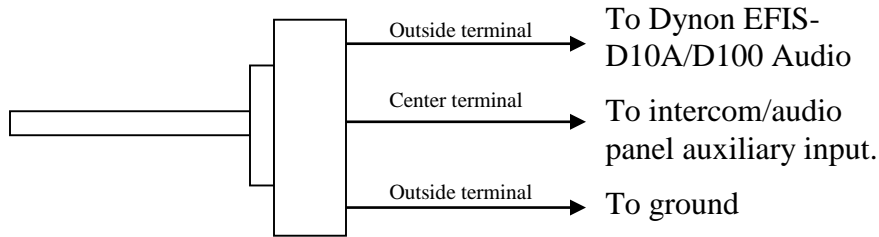
### 3.12 Audio Alert Outputs (Optional)

The EFIS-D10A/D100 has an audio alert output for sounding AOA and altitude alarms through an intercom or audio panel.

Connect the alarm output from the EFIS-D10A/D100 to the outside terminal of a 10 kΩ variable resistor (not included). Ensure that audio outputs are connected similar to the following diagram. The 10 kΩ variable resistor can be obtained from Radio Shack (P/N 271-1715) or other electronics suppliers.

DB25 pin#	Color	Function
18	Green	EFIS Audio Alert Output
16	Black	Audio Ground

Table 3-4 Pin Numbers



**Figure 3-16 AOA and Altitude Alarm Installation**

Connect the center terminal to an auxiliary input on the aircraft's intercom or audio panel. Note that some inputs mute when the radio or intercom are active, and thus audio alerts will not be heard in some situations if these inputs are used. Do not hook the audio directly to a headset.

To set the volume of the AOA alarm, you will need your EFIS-D10A/D100 powered on and the alarm output wired as described above. Enter the EFIS menu by pressing any button (except the leftmost or rightmost) beneath an EFIS page. Press MORE > SETUP > MORE > MORE > MORE > AOAALM. In that menu, press the TEST button. While the button is held down, the AOA alarm will sound. Adjust the variable resistor until the volume in the intercom or audio panel is at an acceptable level. Verify that the volume of this alert does not block the pilot from hearing the stall warning device which is integrated into the airframe.

## 4 POST INSTALLATION CONFIGURATION & CHECKOUT PROCEDURE

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During manufacture, the EFIS-D10A/D100 underwent a comprehensive calibration, verification, and burn-in routine that minimizes setup time and ensures that your EFIS meets Dynon's performance specifications. To account for individual airframes, there are a few simple calibration and configuration steps that you must complete before using the EFIS-D10A/D100.

The following steps must be completed in order as some steps rely on previous settings.

- ❗ It is your responsibility to fly your plane safely while performing any configuration or calibration in flight. The best scenario would include a second person to perform any necessary steps on the unit.

### 4.1 Initial Verification

Turn your unit on by energizing the aircraft power to which it is connected. Ensure that the screen is bright and readable and that all instrument displays appear. *If a desired display item is not present, refer to the User's Guide to use the CLUTTR feature to display the missing item.*

With the unit powered on, verify the following:

- The airspeed indicates zero
- With the kollsman window set to the same value as the aircraft's altimeter, verify the altitudes match within +/-50 feet. NOTE: The altimeter bar of the EFIS-D10A/D100 does not appear until about 10 seconds after power on by design.
- The turn coordinator ball matches the aircraft's ball within ½ ball diameter.
- GPS connection
- Airspeed / Alt check in flight
- Audio check
- Leak check

### 4.2 Units configuration

See TASK 34-23-02 step 4 of the ICA

### 4.3 Airspeed color configuration

See TASK 34-23-02 step 5 of the ICA

### 4.4 AoA configuration and verification.

#### 4.4.1 LEAK CHECK

Dynon's pitot design deliberately has a pin-sized leak hole in each of the two tubes to permit draining any moisture which might accumulate inside. These holes are located in the middle of

the tube at the bottom. Plugging these holes does *not* guarantee a pneumatic seal (although one is sometimes present). The leak that may exist does not affect the performance of the probe. You will, however, need to take it into account when doing pressure/leak tests on your pitot system

#### **4.4.2 CALIBRATION**

Refer to TASK 34-23-06 of the ICA.

### **4.5 Pitot sensor configuration.**

With your plane in as windless an environment as possible (e.g., a hangar), cover both the existing pitot and static ports with a sock or cloth to minimize airflow without putting pressure on the ports. Next, on the Dynon Display, enter the EFIS main menu, press MORE > SETUP > MORE > MORE > MORE > SPDCAL. When you are confident that there is no pressure on the pitot and static ports, press either button corresponding to SET ZERO PRESSURE. Press YES to confirm you have zero pressure on the pitot and static ports. You will see a message indicating that the unit is calibrating. This should only take a few seconds.

### **4.6 Compass verification and heading calibration**

! Heading information can only be displayed if the EDC-D10A is installed.

Further verify proper operation by placing a magnet near the remote compass (an aviation headset often works) and verifying that the indicated heading changes.

If no EDC-D10A is installed, remove the “REMOTE COMPASS NOT DETECTED” warning, or not to be displayed heading indications at the top of the screen by going to EFIS > SETUP > CLUTTR. Press HDG and verify that the warning is removed. In this mode, no heading information will be displayed to the pilot.

For heading calibration see TASK 34-34-02 step 6 of the ICA.

### **4.7 GPS configuration and verification**

You must make sure the settings on your D10A/D100 are set properly, so that it can communicate with the GPS-251. From the EFIS menu, enter SETUP > HSI > EFIS\_SERIAL, and set input to NMEA, and baud rate to auto.

To verify connection, press and hold the rightmost button for two seconds until a black screen appears. Press the DOWN button to select HSI, then GOTO. Verify that the left side of the screen says “waiting for GPS fix” or shows TRK and SPD. If no data is displayed, the GPS is not communicating properly.

The HSI page must be disabled. To remove the HSI page from rotation, press and hold the rightmost button (unless you are already on the screen list page) for two seconds until a black screen appears. Press SETUP > ROTAIN > DOWN (to select HSI) and press TOGGL. To return to the EFIS display, repeat the previous steps, but select EFIS instead of HSI.

## **4.8 OAT Setup and Verification**

See TASK 05-24-06 of the ICA.

## **4.9 Setting Zero Pitch**

See TASK 34-34-02 step 8 of the ICA.

## **4.10 Backup battery verification**

See TASK 05-24-04 the ICA.

## **5 TROUBLESHOOTING**

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### **5.1 Troubleshooting**

Refer to Chapter 34-100-00: 'Dynon Avionics kit number 102778-000 Troubleshooting' of the ICA.

## 6 LIMITATIONS

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### 6.1 Limitations

*The following limitations apply to installations approved by STC SA04075CH:*

1. Every 12 calendar months a certificated mechanic must ensure that the Dynon EFIS-D10A attitude indicator unit is installed in upper center of the instrument cluster (i.e., standard 6 pack arrangement) or the original location of the vacuum driven attitude indicator it replaced. It must also be verified that a certificated Airspeed Indicator, Altimeter, Heading Indicator and Turn Coordinator are installed in the standard 6 pack arrangement or their original production location. The Dynon EFIS-D10A installation may only be considered an Attitude Indicator and may not substitute for any other primary flight instrument.
2. Every calendar 12 months a certificated mechanic must ensure the 100096-000 Dynon EFIS-D10A Internal Back Up Battery is installed and has been tested and found serviceable in accordance with task 05-24-04.
3. Every 12 calendar months a certificated mechanic must ensure that Limitations Placard, must be installed on the instrument panel in the pilot's primary field of view and must be legible. See Chapter 34-80-00 for Limitations Placard installation instructions.
4. Every 24 calendar months the accuracy of the altitude and airspeed displayed on the Dynon EFIS-D10A must be checked in conjunction with the pitot static check required by 14 CFR 91.411 and documented in the aircraft log as required by 14 CFR 43.9. The airspeed displayed on the Dynon EFIS-D10A must agree with the installed Airspeed Indicator within -5 knots / +5 knots. The altitude displayed on the Dynon EFIS-D10A must agree installed Altimeter within -50 feet / +50 feet. Tests of the Airspeed and Altitude values may be achieved using the manufactures instructions or other acceptable data. (See Note in section 05-24-01 of this manual regarding pitot static system checks.)

## **7 PERIODIC MAINTENANCE**

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### **7.1 Caution**

With the exception of replacing the internal backup battery, the EFIS-D10A/D100 contain no user-serviceable parts. Refer all servicing to Dynon Avionics.

### **7.2 Instructions for continued airworthiness**

For all regulatory checks, please refer to the EAA's Instructions for Continued Airworthiness for STC SA04075CH, EAA P/N TJJ-MAN-01.



## 8 APPENDIX

The appendices contain additional information pertaining to the installation and maintenance of the EFIS-D10A. You will find here a table of weights, specifications and a configuration table.

### 8.1 Weights

Adding any new instrument to an aircraft requires the installer to be aware of its weight and how that affects the overall weight and balance of the plane. The following are the weights of the EFIS-D10A and associated Dynon-supplied sensors.

EFIS-D10A + battery .....	1 lb 13.8 oz (0.879 kg)
EFIS-D100 + battery .....	3 lb 4 oz (1.465 kg)
EFIS-D10A Mounting Bracket .....	6.1 oz (0.172 kg)
EFIS-D100 Mounting Bracket .....	1.9 oz (0.054kg)
EFIS 25-pin wiring harness .....	9.6 oz (0.32 kg)
EDC-D10A .....	3.6 oz (0.102 kg)
EFIS OAT .....	2.6 oz (0.08 kg)
Unheated AOA Probe .....	5.7 oz (0.16 kg)
GPS-251 .....	7.4 oz (0.21kg)

### Dynon EFIS-D10A Specifications

<b>Mechanical</b>	Fits into standard 3 1/8" panel hole Optional flush mount bracket available
<b>Operating Temperature</b>	-22° to 122° F (-30° to 50° C)
<b>Power</b>	Voltage: 10 - 30 Vdc Power: <b>8 watts</b> typical; <b>13 watts</b> maximum (when internal battery is charging).
<b>Connections</b>	Wiring: DB25 male connector
<b>Screen</b>	Type: AMLCD, TFT (Thin Film Transistor) Backlight: 450 nits Size: 3.8" diagonal (96 mm) Resolution: 320 x 240 color pixels
<b>Inputs/Outputs</b>	1 - AOA Audio Alarm

## APPENDIX

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1 - RS-232 bidirectional PC communication  
1 - RS-232 GPS data input

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### Dynon EFIS-D100 Specifications

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<b>Mechanical</b>	6.95" wide x 4.90" tall x 4.51" deep (177 x 125 x 115 mm)
<b>Operating Temperature</b>	-22° to 122° F (-30° to 50° C)
<b>Power</b>	Voltage: 10 - 30 Vdc Power: <b>12 watts</b> typical; <b>17 watts</b> maximum
<b>Connections</b>	Wiring: DB25 male connector
<b>Screen</b>	Type: AMLCD, TFT (Thin Film Transistor) Backlight: 400 nits (or 800 nits, if super-bright option purchased) Size: 7.0" diagonal (178 mm) Resolution: 854 x 480 color pixels
<b>Inputs/Outputs</b>	1 - AOA Audio Alarm 1 - RS-232 bidirectional PC communication 1 - RS-232 data inputs (GPS, SL30, etc.) 1 - RS-232 serial encoder output 1 - Dynon Smart Avionics Bus (DSAB) multidrop

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