

INSTALLATION MANUAL  
Multi-function Digital Bus Reader  
Model IND-5000, P/N 50-5004-(XX)  
SAT, / TAS, December, 1995

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## i. Operating Instructions

### 1. General

IND-5000 P/N 50-5004-(XX) operation is dependent on the digital output of the on-board system to which it is interfaced. The operating instructions for that system will need to be followed.

The IND-5000 P/N 50-5004-(XX) indicator has no "OFF/ON" switch. The unit becomes operational upon application of aircraft power.

The IND-5000 P/N 50-5004-(XX) indicator provides the following information on a two line display.

SAT ---  
TAS ---

### 2. Controls

The "DIM" control adjusts the LED display brightness. (NOTE: The panel back lighting is controlled by the aircraft's instrument panel dimming.)

### 3. Flags and Warnings

The IND-5000 P/N 50-5004-(XX) indicator will delete the information display to automatically display the following flags and warnings:

RECR IDLE	No data. Buss idle
SAT XXXX TAS XXXX	Valid Static Air Temp. Valid True Air Speed
----	Invalid Top Line data. (4 dashes for label.)
----	Invalid Bottom Line data. (4 dashes)
(BLANK)	Power or unit failure. (Screen blank.)

## ii. Equipment Limitations

The IND-5000 indicator is only a display of ARINC digital data received from other on-board flight or navigation system outputs. The update speed, accuracy, and data available for display is directly limited to the output of the system to which it is interfaced. In effect, it is a display component of that flight or navigation system and therefore subject to all inherent limitations of those systems.

The IND-5000 operates at 22 to 29.5 VDC power. It cannot be used for emergency 18 VDC operation.

### iii. Installation Procedures

#### 1. Introduction

This section contains information relative to the installation of the IND-5000 indicator to assure satisfactory performance of the unit. (See sections iv. and v. for detailed mechanical and wiring diagrams.)

#### 2. Unpacking and Inspecting Equipment

After unpacking the IND-5000, make a visual inspection of the unit for evidence of damage incurred during shipment. If a claim for damage is to be made, save the shipping container to substantiate the claim.

#### 3. Pre-Installation Check

The IND-5000 should be bench checked for proper system operation prior to being installed in the aircraft.

#### 4. Power Requirements

The IND-5000 has been designed to accept from 22 to 29.5 VDC power with no special modification or wiring considerations. The IND-5000 operates from a standard +28 VDC aircraft power source. Circuit protection should be provided with an in-line 0.5 Amp breaker. Panel dimming for the unit can be either +5 or +28 VDC, depending on aircraft requirements.

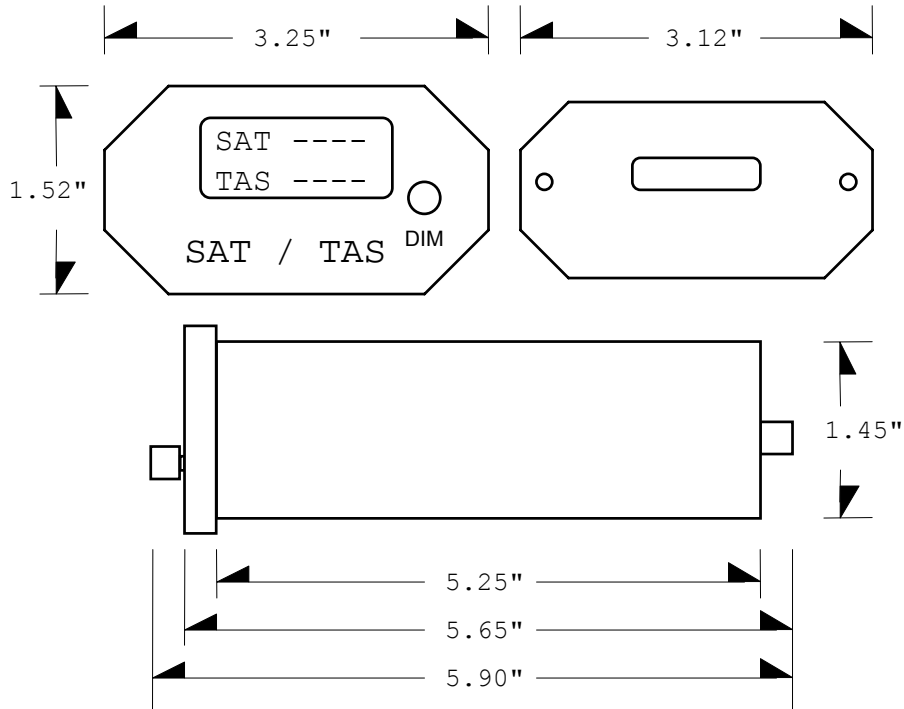
#### 5. Post-installation Check

Power: Upon application of the aircraft 28 VDC power. Verify the IND-5000 displays any of the alphanumeric LED displays. (i.e. a flag display.) System Check: After the system to which the IND-5000 has been interfaced has been verified and is operating, verify that each data format function is operational. Verify numerical data to other system displays where applicable. (i.e. CDU, EFIS, etc.)

iv. Installation Specifications: Physical

1. Mechanical

The IND-5000 is designed for rigid mounting in the aircraft instrument panel; a standard 1/2 3ATI cutout and mounting clamp.



IND-5000 P/N 50-5004-(XX) Mechanical Drawing  
(Illustration vi-1)

2. Electrical

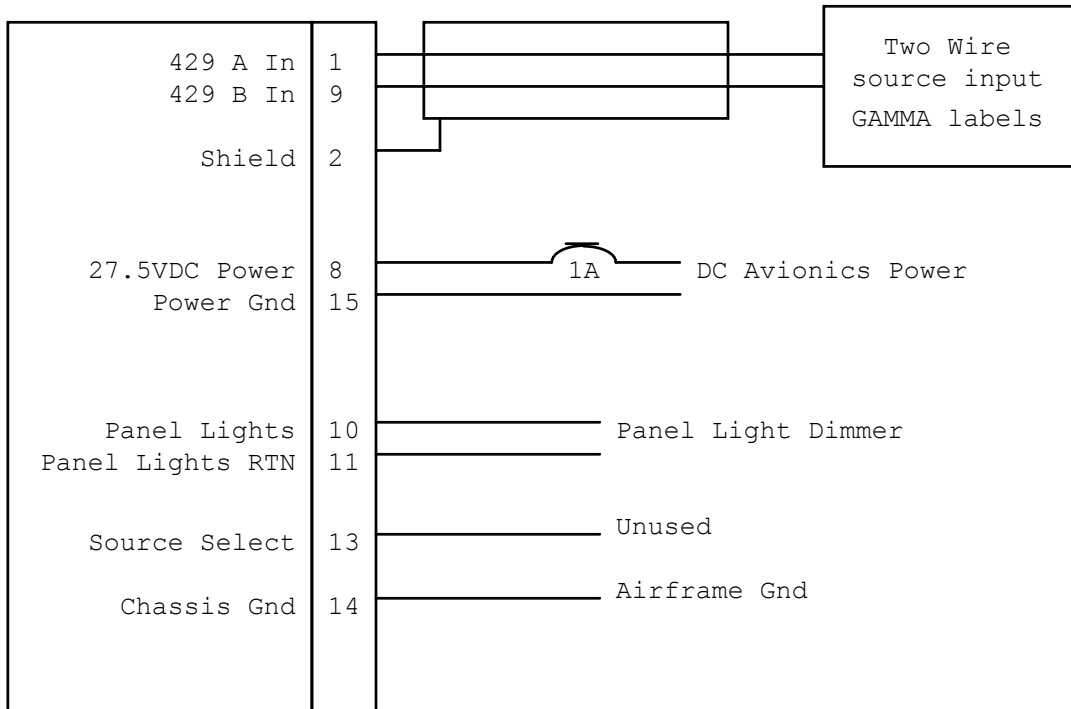
IND-5000 Connector- DA 15P (AMP P/N 745093-1)  
Mate- DA 15S with male screw retainer (Standard)

v. Installation Specifications: Electrical

1. Pinout Diagram

Connector: DA 15P  
 Mate: DA 15S

(AMP P/N 745093-1)  
 (Standard 15 pin with male screw retainer)



IND-5000 P/N 50-5004-(XX) Pinout  
 (illustration v-1)

v. Installation Specifications: Electrical (Continued)

2. Data Format

Labels of the input being used must conform to the ARINC GAMMA 429 formatted standards. Data labels required for the proper operation of the IND-5000, P/N 50-5004-(XX) are as follows:

Name	Label
SAT	213
TAS	210

SAT Label 213: Static Air Temperature  
 Update rate: function of ADC  
 Transmission rate: minimum of four times per second.

```
Bit 3 * 332 * 2222222211 * 111111110 * 00000000
     2 * 109 * 87654321098 * 765432109 * 87654321
     P * SSM * 2'complement* pad * 11010001
           integer 1/4° Centegrade
```

Where: SSM is 110 = positive & 111 = negative, else invalid.  
 P is odd parity. (Ignored)

TAS Label 210: True Air Speed  
 Update rate: function of ADC  
 Transmission rate: minimum of four times per second.

```
Bit 3 * 332 * 2222222211 * 111111110 * 00000000
     2 * 109 * 87654321098 * 765432109 * 87654321
     P * SSM * Integer * pad * 00010001
           Sixteenth Knot
```

Where: SSM is 110 = valid, else invalid.  
 P is odd parity. (Ignored)



vi. Specifications

Specification	Characteristics
Compliance	TSO C113 - SAE AS 8034, RTCA DO160B A1/B/A/KPS/XXXXXX/A/A/A/A/A/A
Display Characteristics:	
Display	5 X 7 Dot Matrix LED
Characters	English Font Alphanumeric
Character Size	0.20" X 0.112"
Contrast	Minimum 5 in 10K fc Direct Sunlight
Luminous Intensity	Minimum 2400 fc / Typical 3400 fc
Viewing Angle	Lateral 130o / Vertical 90o
Viewing Distance	10" to 100" (29" Nominal)
Physical Dimensions:	
Height	3.25"
Length	5.90"
Width	1.52"
Weight	18ozs.
Temperature Range	Operational: -20oC to +70oC
Altitude	Controlled environment equivalent to 15000 ft. nonpressurized.
Power Requirements:	28VDC at 0.5 Amps Peak, 0.275 Amps nominal.
Digital Input	ARINC 429, GAMMA: Label 210 (True Air Speed) Label 213 (Static Air Temperature)
Range	True Air Speed 0 to 1023 Kts. Static Air Temperature + 511oC
Accuracy (to Received data)	True Air Speed + 1Kt. Static Air Temperature + 1oC

vii. Major Components

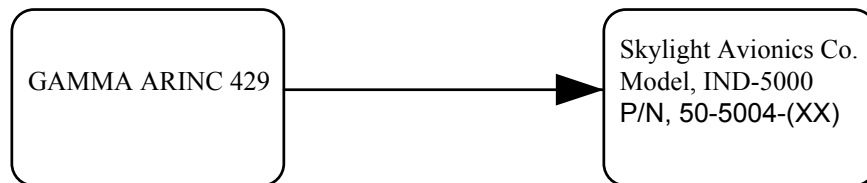
1. Equipment Supplied

Model IND-5000 P/N 50-5004-(XX)	
Dim voltage, faceplate color	P/N
5V, Black faceplate	50-5004-01
28V, Black faceplate	50-5004-02
5V, Gray faceplate	50-5004-11
28V, Gray faceplate	50-5004-12

2. Equipment Required but not supplied

- 1ea Standard 1/2 3ATI panel mounting clamp
- 1ea Interconnect kit
- 1ea Standard DA 15S connector with screw retainers

3. Interconnection



Interconnect Block Diagram  
(Illustration vi-1)

(a) Connect to any 429 instrument, flight, or navigation unit, general purpose bus, which outputs correct GAMMA labels (See Section v.). Interconnect varies by manufacturer.

viii. Environmental Qualification Form

1. Nomenclature: IND-5000 Multi-function Digital Bus Reader  
 2. Part Number: 50-5004-(XX)  
 3. TSO Number: C113  
 4. Manufacture's Specification: None  
 5. Manufacturer: Skylight Avionics Company  
 38629 6th Street East  
 Palmdale, CA. 93550, USA

6. TEST:

Conditions	Section/ Paragraph	Test Conducted
Temperature & Altitude	4.0	Equipment tested to Category: A1
Low Temperature	4.5.1	
High Temperature	4.5.2/3	
Altitude Tests	4.6.1	
Decompression Tests	4.6.2	
Overcompression Tests	4.6.3	
Temperature Variation	5.0	Category B
Humidity	6.0	Category A
Shock	7.0	Equipment tested per DO-160B
Operational	7.2	Paragraph 7.1.1
Crash Safety	7.3	
Vibration	8.0	Equipment tested without shock mounts to Categories K,P and S (DO-160B, Table 8-1)
Explosion	9.0	"X" No tests required
Waterproofness	10.0	"X" No tests required
Fluids Susceptibility	11.0	"X" No tests required
Sand & Dust	12.0	"X" No tests required

viii. Environmental Qualification Form (continued)

Conditions	Section/ Paragraph	Test Conducted
Fungus	13.0	"X" No tests required
Salt Spray	14.0	"X" No tests required
Magnetic Effect	15.0	Tested as Class "A"
Power Input	16.0	Category A
Voltage Spike Conducted	17.0	Category A
Audio Frequency Conducted Susceptibility	18.0	Category A
Induced Signal Susceptibility	19.0	Category A
Radio Frequency	20.0	Category A
Radio Frequency Emission	21.0	Category A

Remarks:

Tests 4.0, 5.0, 6.0, 7.0 and 8.0 were conducted at:  
A-BEC Environmental Testing Laboratories.

Tests 15.0, 16.0, 17.0, 18.0, 19.0, 20.0 and 21.0 were  
conducted at:  
McPete Systems Company, EMC Science Center.

Compliance to FAR part 25 demonstrated by component parts  
and material analysis.