



**FAA Approved  
Supplemental Airplane Flight Manual**

**DOCUMENT NUMBER 172056**

**For**

**Cessna 172 M & N**

**Serial No. 17265685 to 17271034**

**Serial No:** 17270373 **Reg. #:** N738ZU

The information contained in this flight manual is FAA Approved Material, which, Along with the FAA Approved placards and instrument markings, is applicable to the operation of the airplane when modified in accordance with STC 2196CE, which increases the maximum certificated takeoff weight to 2550 LBS and limits the flap travel to 30 degrees. The airplane must previously have been modified in accordance with ATS SA4428SW which installs a 180HP Lycoming O-360 series and a fixed pitch propeller.

for FAA Approved   
Margaret Kline  
Manager, Wichita Aircraft Certification Office  
FAA Central Region  
Wichita,KS

Date: 2/3/2012

Original Date: 09/25/86

## LOG OF REVISIONS

| Revision | Page  | Description  | Approved        | Date            |
|----------|-------|--|-----------------|-----------------|
| Orig     | All   | Original Issue   | -               | 09/25/86        |
| 1        | 1-10  | Changed Page Numbers<br>Revised Cover Sheet<br>Added Engine Models   | G.M. Baker      | 10/02/87        |
| 2        | 1-10  | Added M Models<br>Changed name to Air Plains Services,<br>Corp   | G. M. Baker     | 07/06/88        |
| 3        | 3 & 4 | Added O-360-A4N  | B.L. Sorensen   | 3/21/90         |
| 4        | All   | Reformatted, Added Document Number,<br>Moved Table of Contents from Cover<br>Page and Included Section Applicability,<br>Added Propellers,<br>Added Fuel Consumption Chart,<br>Added Section 7 Handling Service And<br>Maintenance | <i>DM Baker</i> | <i>2/3/2012</i> |



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## **SECTION 1: GENERAL**

### **DESCRIPTIVE DATA**

#### **ENGINE**

Engine Model Number: O-360-A2F, A3A, A4A, A4M, and A4N  
Engine Type: Normally aspirated, direct drive, air cooled, horizontally opposed, carburetor equipped, four cylinder engine with 360 cu. in. displacement.  
Horsepower Rating and Engine Speed 180 rated BHP at 2700RPM.  
Maximum Continuous RPM: 2700 RPM

#### **PROPELLERS:**

##### **Sensenich Propellers approved on installations using the O-360-A4 series engines only**

Propeller Manufacturer: Sensenich Corporation

Propeller Model Number: 76EM8S14-0-60

Number of Blades: 2.

Propeller Diameter: Maximum ..... 76 inches.  
Minimum ..... 76 inches.

Pitch Range: 62" to 56 "

Propeller Manufacturer: Sensenich Corporation.

Propeller Model Number: 76EM8S-0-60 (when using MKA3.5 prop spacer).

Number of Blades: 2.

Propeller Diameter: Maximum: ..... 76 inches.  
Minimum: ..... 76 inches.

Pitch Range: 62" to 56"

##### **Approved on all approved engine installations:**

Propeller Manufacturer: McCauley Accessory Division.

Propeller Model Number: 1A170/CFA  
1A170E/CFA

Number of Blades: 2.

Propeller Diameter: Maximum: ..... 76 inches.  
Minimum: ..... 74.5 inches.

Propeller Type: Fixed Pitch

Pitch Range: 60" to 56"



**Approved on installations using the O-360-A4A, -A4M, -A4N, and A3A engines only:**

Propeller Manufacturer: McCauley Accessory Division.  
Propeller Model Number: 1A170/JFA

Number of Blades: 2.

Propeller Diameter: Maximum: ..... 76 inches.  
Minimum: ..... 74.5 inches.

Propeller Type: Fixed Pitch

Pitch Range: 60" to 56"

**MAXIMUM CERTIFICATED WEIGHTS**

|          |               |           |
|----------|---------------|-----------|
| Takeoff, | Normal.....   | 2550 lbs. |
|          | Utility ..... | 2000 lbs. |
| Landing, | Normal.....   | 2550 lbs. |
|          | Utility ..... | 2000 lbs. |

## SECTION 2: LIMITATIONS

### AIRSPEED INDICATOR MARKINGS

Air Plains Services PN: 172861 or 172861-2 or existing airspeed indicator, marked as follows:

| MARKING         | KIAS VALUE OR RANGE |
|-----------------|---------------------|
| White Arc ..... | 40-85               |
| Green Arc.....  | 50-127              |
| Yellow Arc..... | 127-158             |
| Red Line .....  | 158                 |

### AIRSPEED LIMITATIONS

|    |                    |          |
|----|--------------------|----------|
| VA | Maneuvering Speed: |          |
|    | 2550 Pounds .....  | 105 KIAS |
|    | 2150 Pounds .....  | 95 KIAS  |
|    | 1750 Pounds .....  | 85 KIAS  |

### POWER PLANT LIMITATIONS

Engine Model Number: O-360-A2F, A3A, A4A, A4M and A4N  
 Maximum Power: 180 BHP rating  
 Maximum Continuous RPM: 2700 RPM

Static RPM Limits: 2250 to 2450 RPM

### WEIGHT LIMITS

|                         |           |
|-------------------------|-----------|
| Maximum Takeoff Weight, |           |
| Normal .....            | 2550 lbs. |
| Utility .....           | 2000 lbs. |
| Maximum Landing Weight, |           |
| Normal .....            | 2550 lbs. |
| Utility .....           | 2000 lbs. |

## CENTER OF GRAVITY LIMITS –

### NORMAL CATEGORY

Center of Gravity Range:

Forward: 35 inches aft of datum at 1950 lbs. or less, with straight line variation to 41.0 inches aft of datum at 2550 lbs.

Aft: 47.3 inches aft of datum at all weights.

### UTILITY CATEGORY

Center of Gravity:

Forward: 35 inches aft of datum at 1950lbs. or less, with straight line variation to 35.5 inches aft of datum at 2000lbs.

Aft: 40.5 inches aft of datum at all weights.

## FLIGHT LOAD FACTORS

### NORMAL CATEGORY

Flight Load Factors (Maximum Takeoff Weight - 2550 lbs.):

Flaps Up ..... +3.8g, -1.52g

Flaps Down..... +3.0g

## PLACARDS

10 . Near airspeed indicator:

**MANEUVER SPEED - 105 KIAS**

## **SECTION 3: EMERGENCY PROCEDURES**

### **AIRSPEEDS FOR EMERGENCY OPERATION**

|   |          |
|---|----------|
| Engine Failure after Takeoff:                 |          |
| Wing Flaps Up .....                           | 70 KIAS  |
| Wing Flaps Down.....                          | 65 KIAS  |
| Maneuvering Speed:                            |          |
| 2550 lbs .....                                | 105 KIAS |
| 2150 lbs .....                                | 95 KIAS  |
| 1750 lbs .....                                | 85 KIAS  |
| Maximum Glide:                                |          |
| 2550 lbs .....                                | 68 KIAS  |
| 2150 lbs .....                                | 62 KIAS  |
| 1750 lbs .....                                | 56 KIAS  |
| Precautionary Landing With Engine Power ..... | 65 KIAS  |
| Landing Without Engine Power:                 |          |
| Wing Flaps Up .....                           | 70 KIAS  |
| Wing Flaps Down.....                          | 65 KIAS  |

### **ENGINE FAILURES**

#### **ENGINE FAILURE IMMEDIATELY AFTER TAKEOFF**

- Airspeed ..... 70 KIAS (Flaps Up)  
65 KIAS (Flaps Down)

#### **ENGINE FAILURE DURING FLIGHT**

- Airspeed ..... 75 KIAS

### **FORCED LANDINGS**

#### **EMERGENCY LANDING WITHOUT ENGINE POWER**

- Airspeed ..... 70 KIAS (Flaps Up)  
65 KIAS (Flaps Down)
- Wing Flaps ..... AS REQUIRED (30° recommended)

#### **PRECAUTIONARY LANDING WITH ENGINE POWER**

- Airspeed..... 65 KIAS
- Wing Flaps ..... 30° (on final approach).
- Airspeed..... 65 KIAS

**DITCHING**

4. Wing Flaps .....20-30°

**NOTE**

If no power is available, approach at 70 KIAS with flaps up or at 65 KIAS with 10° flaps.

**ICING****INADVERTENT ICING ENCOUNTER**

11. Approach at 80 to 90 KIAS depending upon the amount of the accumulation.

## SECTION 4. NORMAL PROCEDURES

### NORMAL PROCEDURES

#### SPEEDS FOR NORMAL OPERATION

Unless otherwise noted, the following speeds are based on a maximum weight of 2550 pounds and may be used for any lesser weight.

#### Takeoff

|  |            |
|--|------------|
| Normal Climb Out.....                                  | 75-85 KIAS |
| Short Field Takeoff, Flaps 10°, Speed at 50 Feet ..... | 57 KIAS    |

#### Enroute Climb, Flaps Up:

|                                       |            |
|---------------------------------------|------------|
| Normal, Sea Level.....                | 75-85 KIAS |
| Normal, 10,000 Feet.....              | 70-80 KIAS |
| Best Rate of Climb, Sea Level .....   | 73 KIAS    |
| Best Rate of Climb, 10,000 Feet ..... | 72 KIAS    |
| Best Angle of Climb, Sea Level.....   | 62 KIAS    |
| Best Angle of Climb, 10,000 Feet..... | 67 KIAS    |

#### Landing Approach:

|                                       |            |
|---------------------------------------|------------|
| Normal Approach, Flaps Up .....       | 65-75 KIAS |
| Normal Approach, Flaps 30° .....      | 60-70 KIAS |
| Short Field Approach, Flaps 30° ..... | 62 KIAS    |

#### Balked Landing:

|                                |         |
|--------------------------------|---------|
| Maximum Power, Flaps 20° ..... | 60 KIAS |
|--------------------------------|---------|

#### Maximum Recommended Turbulent Air Penetration Speed:

|                |          |
|----------------|----------|
| 2550 Lbs ..... | 105 KIAS |
| 2150 Lbs ..... | 95 KIAS  |
| 1750 Lbs ..... | 85 KIAS  |

### SHORT FIELD TAKEOFF

|                   |   |
|-------------------|---|
| Climb Speed ..... | 57 KIAS (until all obstacles are cleared) |
|-------------------|---|

### ENROUTE CLIMB

|                |            |
|----------------|------------|
| Airspeed ..... | 75-85 KIAS |
|----------------|------------|





## LANDING

### NORMAL LANDING

1. Airspeed..... 65-75 KIAS (Flaps Up)
2. Wing Flaps ..... AS DESIRED (0-10° below 110 KIAS)  
10-30° below 85 KIAS)
3. Airspeed..... 60-70 KIAS (Flaps Down)

### SHORT FIELD LANDING

1. Airspeed..... 65-75 KIAS (Flaps Up)
2. Wing Flaps ..... FULL DOWN (30°)
3. Airspeed..... 62 KIAS (until flare)

### BALKED LANDING

5. Wing Flaps ..... 10° (until obstacles are cleared)  
RETRACT SLOWLY after reaching a safe altitude and 65 KIAS.

## SECTION 5: PERFORMANCE

### LANDING DISTANCE - SHORT FIELD

**CONDITIONS:**

Flaps 30°

**NOTES:**

If a landing with flaps up is necessary, increase approach speed by 9 KIAS and allow for 35% longer distance.

| Weight<br>LBS | Speed<br>At<br>50 Ft<br>KIAS | Press<br>Alt<br>Ft | 0°C                |   | 10°C               |   | 20°C               |   | 30°C               |   | 40°C               |   |
|---------------|------------------------------|--------------------|--------------------|---|--------------------|---|--------------------|---|--------------------|---|--------------------|---|
|               |                              |                    | Grnd<br>Roll<br>Ft | Total<br>Ft To<br>Clear<br>50 Ft<br>Obs | Grnd<br>Roll<br>Ft | Total<br>Ft To<br>Clear<br>50 Ft<br>Obs | Grnd<br>Roll<br>Ft | Total<br>Ft To<br>Clear<br>50 Ft<br>Obs | Grnd<br>Roll<br>Ft | Total<br>Ft To<br>Clear<br>50 Ft<br>Obs | Grnd<br>Roll<br>Ft | Total<br>Ft To<br>Clear<br>50 Ft<br>Obs |
| 2550          | 62                           | S.L                | 545                | 1290                                    | 565                | 1320                                    | 585                | 1350                                    | 605                | 1380                                    | 625                | 1415                                    |
|               |                              | 1000               | 565                | 1320                                    | 585                | 1350                                    | 605                | 1385                                    | 625                | 1420                                    | 650                | 1450                                    |
|               |                              | 2000               | 585                | 1355                                    | 610                | 1385                                    | 630                | 1420                                    | 650                | 1455                                    | 670                | 1490                                    |
|               |                              | 3000               | 610                | 1385                                    | 630                | 1425                                    | 655                | 1460                                    | 675                | 1495                                    | 695                | 1530                                    |
|               |                              | 4000               | 630                | 1425                                    | 655                | 1460                                    | 675                | 1495                                    | 700                | 1535                                    | 725                | 1570                                    |
|               |                              | 5000               | 655                | 1460                                    | 680                | 1500                                    | 705                | 1535                                    | 725                | 1575                                    | 750                | 1615                                    |
|               |                              | 6000               | 680                | 1500                                    | 705                | 1540                                    | 730                | 1580                                    | 755                | 1620                                    | 780                | 1660                                    |
|               |                              | 7000               | 705                | 1545                                    | 730                | 1585                                    | 760                | 1625                                    | 785                | 1665                                    | 810                | 1705                                    |
|               |                              | 8000               | 735                | 1585                                    | 760                | 1630                                    | 790                | 1670                                    | 815                | 1715                                    | 840                | 1755                                    |

**CRUISE FUEL CONSUMPTION**

(Not FAA Approved)

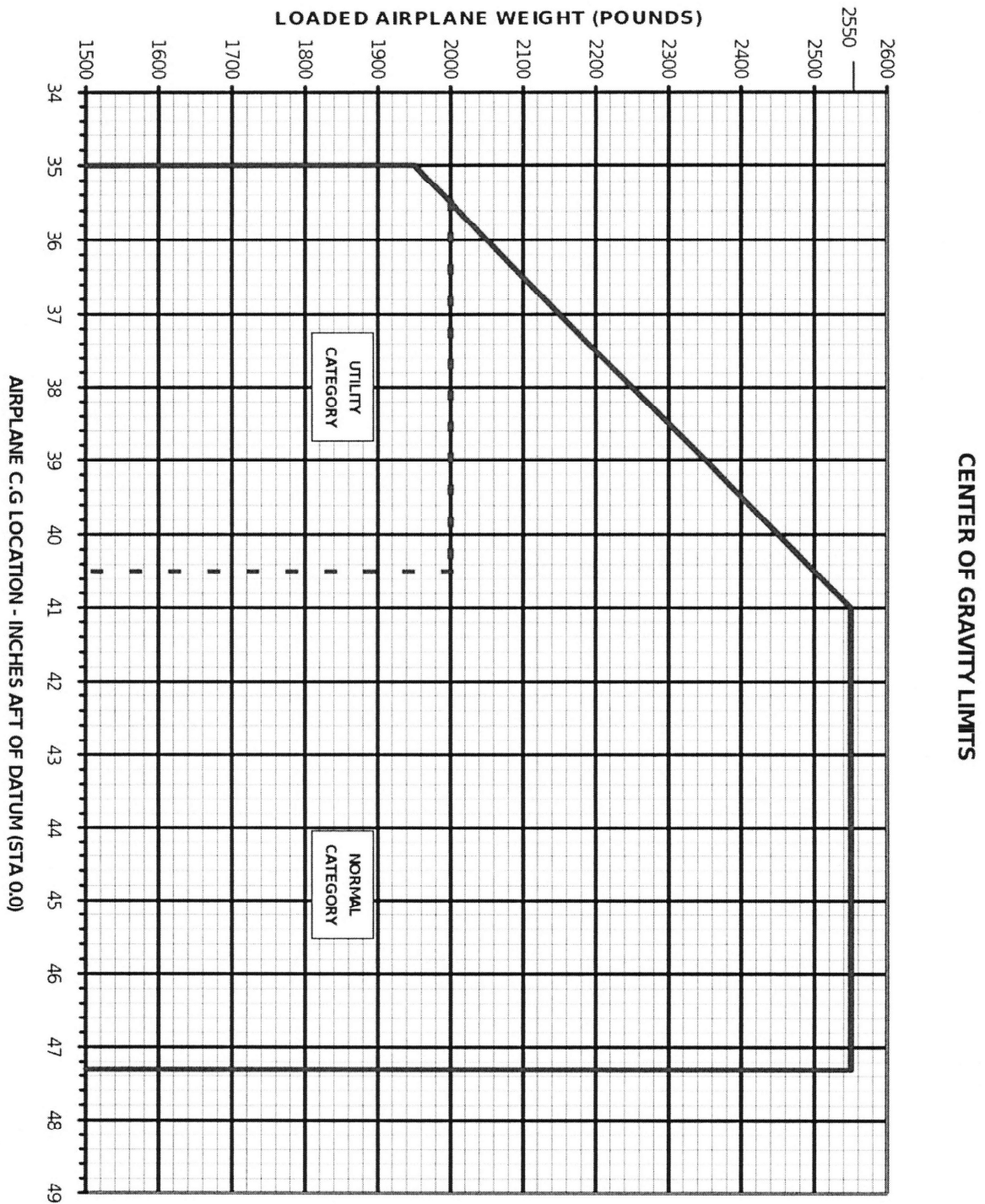
**Conditions:**

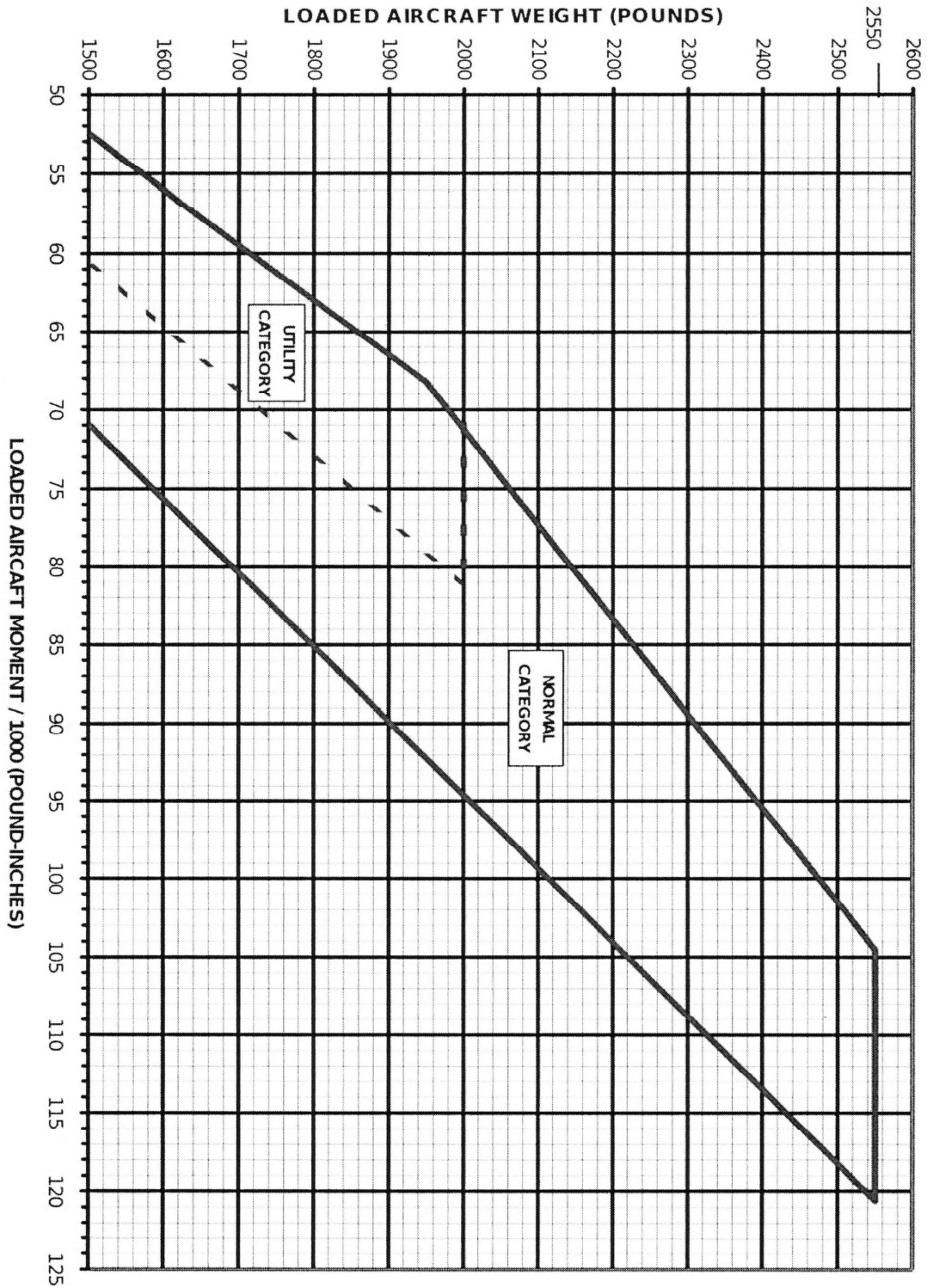
2550 Pounds

| Recommended Lean Mixture |             | 20°C Below Standard Temp. |             | Standard Temperature |             | 20°C Above Standard Temp. |            |
|--------------------------|-------------|---------------------------|-------------|----------------------|-------------|---------------------------|------------|
| Press. Alt Feet          | RPM         | % BHP                     | GPH         | % BHP                | GPH         | % BHP                     | GPH        |
| <b>2000</b>              | <b>2550</b> | ---                       | ---         | <b>76</b>            | <b>10.2</b> | <b>72</b>                 | <b>9.6</b> |
|                          | 2500        | 77                        | 10.3        | 72                   | 9.6         | 68                        | 9.1        |
|                          | 2400        | 69                        | 9.2         | 64                   | 8.7         | 61                        | 8.3        |
|                          | 2300        | 61                        | 8.3         | 58                   | 7.9         | 55                        | 7.6        |
|                          | 2200        | 55                        | 7.5         | 52                   | 7.2         | 49                        | 6.9        |
|                          | 2100        | 49                        | 6.8         | 46                   | 6.6         | 43                        | 6.3        |
| <b>4000</b>              | <b>2600</b> | ---                       | ---         | <b>76</b>            | <b>10.2</b> | <b>72</b>                 | <b>9.6</b> |
|                          | 2500        | 73                        | 9.7         | 68                   | 9.2         | 65                        | 8.7        |
|                          | 2400        | 65                        | 8.8         | 62                   | 8.3         | 58                        | 8.0        |
|                          | 2300        | 58                        | 8.0         | 55                   | 7.6         | 52                        | 7.3        |
|                          | 2200        | 52                        | 7.3         | 49                   | 6.9         | 47                        | 6.6        |
|                          | 2100        | 46                        | 6.6         | 44                   | 6.3         | 41                        | 6.1        |
| <b>6000</b>              | <b>2650</b> | ---                       | ---         | <b>76</b>            | <b>10.1</b> | <b>72</b>                 | <b>9.6</b> |
|                          | 2600        | 77                        | 10.3        | 72                   | 9.6         | 68                        | 9.1        |
|                          | 2500        | 69                        | 9.3         | 65                   | 8.8         | 62                        | 8.4        |
|                          | 2400        | 62                        | 8.4         | 59                   | 8.0         | 56                        | 7.6        |
|                          | 2300        | 56                        | 7.7         | 53                   | 7.3         | 50                        | 7.0        |
|                          | 2200        | 50                        | 7.0         | 47                   | 6.7         | 44                        | 6.4        |
| <b>8000</b>              | <b>2700</b> | ---                       | ---         | <b>76</b>            | <b>10.1</b> | <b>71</b>                 | <b>9.5</b> |
|                          | 2600        | 73                        | 9.8         | 69                   | 9.2         | 65                        | 8.7        |
|                          | 2500        | 66                        | 8.8         | 62                   | 8.4         | 59                        | 8.0        |
|                          | 2400        | 59                        | 8.1         | 56                   | 7.7         | 53                        | 7.3        |
|                          | 2300        | 53                        | 7.4         | 50                   | 7.0         | 47                        | 6.7        |
|                          | 2200        | 47                        | 6.7         | 45                   | 6.4         | 42                        | 6.1        |
| <b>10,000</b>            | <b>2700</b> | <b>77</b>                 | <b>10.2</b> | <b>72</b>            | <b>9.6</b>  | <b>68</b>                 | <b>9.1</b> |
|                          | 2600        | 69                        | 9.3         | 65                   | 8.8         | 62                        | 8.4        |
|                          | 2500        | 63                        | 8.5         | 59                   | 8.1         | 56                        | 7.7        |
|                          | 2400        | 57                        | 7.8         | 53                   | 7.4         | 50                        | 7.0        |
|                          | 2300        | 51                        | 7.1         | 48                   | 6.8         | 45                        | 6.5        |
|                          | 2200        | 47                        | 6.7         | 45                   | 6.4         | 42                        | 6.1        |
| <b>12,000</b>            | <b>2700</b> | <b>69</b>                 | <b>9.3</b>  | <b>65</b>            | <b>8.8</b>  | <b>62</b>                 | <b>8.4</b> |
|                          | 2600        | 66                        | 8.9         | 62                   | 8.4         | 59                        | 8.0        |
|                          | 2500        | 60                        | 8.2         | 56                   | 7.7         | 53                        | 7.4        |
|                          | 2400        | 54                        | 7.5         | 51                   | 7.1         | 48                        | 6.7        |
|                          | 2300        | 48                        | 6.8         | 45                   | 6.5         | 42                        | 6.2        |
|                          | 2200        | 47                        | 6.7         | 45                   | 6.4         | 42                        | 6.1        |



## SECTION 6: WEIGHT AND BALANCE





## **SECTION 7: HANDLING, SERVICE AND MAINTENANCE**

To operate at the 2550 gross weight, the aircraft must be equipped with 6 or more ply tires on both the main wheels and nose wheel on all models.

- Tire Pressure should be:
  - ◆ Nose Gear ..... 45 psi
  - ◆ Main Gear ..... 38 psi



U.S. Department of  
Transportation  
Federal Aviation  
Administration

## MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)

Form Approved  
OMB No. 2120-0020

For FAA Use Only

Office Identification

**INSTRUCTIONS:** Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed \$1,000 for each such violation (Section 901 Federal Aviation Act 1958)

|                    |  |  |
|--------------------|--|--|
| <b>1. Aircraft</b> | Make<br>Cessna   | Model<br>172N  |
|                    | Serial No.<br>17270373   | Nationality and Registration Mark<br>N738ZU  |
| <b>2. Owner</b>    | Name (As shown on registration certificate)<br>CARDWELL DENNIS S | Address (As shown on registration certificate)<br>2 AGUILA WAY<br>COTO DE CAZA CA 92679-5123 |

**3. For FAA Use Only**

**4. Unit Identification**

**5. Type**

| Unit       | Make                                       | Model | Serial No. | Repair | Alteration |
|------------|--|-------|------------|--------|------------|
| AIRFRAME   | ----- (As described in item 1 above) ----- |       |            |        | X          |
| POWERPLANT |  |       |            |        |            |
| PROPELLER  |  |       |            |        |            |
| APPLIANCE  | Type                                       |       |            |        |            |
|            | Manufacturer                               |       |            |        |            |

**6. Conformity Statement**

|  |   |                                       |
|--|---|---------------------------------------|
| <b>A. Agency's Name and Address</b><br>Zenith Flight Support | <b>B. Kind of Agency</b><br><input type="checkbox"/> U.S. Certificated Mechanic<br><input type="checkbox"/> Foreign Certificated Mechanic<br><input checked="" type="checkbox"/> Certificated Repair Station<br><input type="checkbox"/> Manufacturer | <b>C. Certificate No.</b><br>YE8R561Y |
|--|---|---------------------------------------|

D. I certify that the repair and/or alteration made to the unit(s) identified in item 4 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

|                    |  |
|--------------------|--|
| Date<br>05/04/2007 | Signature of Authorized Individual<br> |
|--------------------|--|

**7. Approval for Return to Service**

Pursuant to the authority given persons specified below, the unit identified in item 4 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is  APPROVED  REJECTED

|   |                             |  |                |   |                 |
|---|-----------------------------|--|----------------|---|-----------------|
| <b>BY</b>                                   | FAA Fit Standards Inspector |  | Manufacturer   | Inspection Authorization                                | Other (Specify) |
|   | FAA Designee                | X  | Repair Station | Person Approved by Transport Canada Airworthiness Group |                 |
| Date of Approval or Rejection<br>05/04/2007 |                             | Certificate or Designation No.<br>YE8R561Y |                | Signature of Authorized Individual<br>                  |                 |



## NOTICE

*Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.*

### 8. Description of Work Accomplished

*(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)*

Removed the following equipment:

kx 125 nav/com

k1208 CDI

KA39 VOLTAGE CONVERTER

KN64 DME

ADF 300

IN346A ADF INDICATOR

L346A LOOP ANTENNA

GPS60 GPS UNIT

TRANS CAL D120

RT359A TRANSPONDER

Installed:

New Garmin GNS430W GPS/NAV/COM s/n 23401278 in accordance with manufacturer installation manual p/n 190-00140-02 and per STC # SA01993LA

New Garmin #1 CDI indicator model GIA106A with G/S per manufacturer installation specification and coupled to the newly installed GNS430W to meet IFR installation requirements for both remote course indication and annunciation.

New GA55 GPS antenna to top section of fuselage per manufacturer specifications

New GTX330 TRANSPONDER per manufacturer installation manual 190-00207-02

New SSD120-30A ENCODER

New CI1125 ENCODER

Aircraft Weight and balance updated

Aircraft test flow for IFR navigation and found satisfactory in enroute, transition and approach phases of flight

Aircraft equipment tested and approved for VOR/LOC/GS and WAAS GPS based IFR navigation

All work carried out per manufacturer requirements and specification and in accordance with FAR 43-13 1B

Additional Sheets Are Attached