

# MANDATORY SERVICE BULLETIN

## NO. MSB-40-048/2

### SUPERSEDES MSB-40-048/1

## **I TECHNICAL DETAILS**

### **I.1 Category**

Mandatory.

### **I.2 Airplanes affected**

Type: DA 40

Serial Numbers: all GARMIN G1000 equipped DA40 in accordance with EASA STC.IM.A.S.01023 (FAA STC SA01254WI), with less than 50 hours total time from serial number 40.448 through 40.673, excluding 40.538, 40.590, 40.641, 40.642, 40.644, 40.651, 40.654, 40.655, and 40.669 .

### **I.3 Date of Effectivity**

18-Sep-2006.

### **I.4 Time of Compliance**

Before next flight but not later than 30 November 2006

### **I.5 Subject**

During production installation of the GARMIN G1000 STC some parts of the installed fuel system indicating system were contaminated with particles from the manufacturing process.

This may lead to contamination of the fuel supply lines and thus improper engine operation, power loss or in-flight engine failure.

### **I.6 Reason**

To prevent loss of engine power or improper operation.

Revision "1": Update of WI-MSB-40-048

Revision "2": Clarification of Subject, update of WI-MSB-40-048/1

**I.7 Concurrent Documents**

None

**I.8 Approval**

The technical content of this document has been approved under the authority of DOA No. EASA.21J.052.

**I.9 Accomplishment/Instructions**

- a. Comply with WI-MSB-40-048, latest effective issue

**I.10 Mass (Weight) and CG**

No change to weight and balance.

**II PLANNING INFORMATION****II.1 Material & Availability**

WI-MSB-40-048 and needed parts are available through DAI.

**II.2 Special Tools**

None.

**II.3 Labor effort**

7 hours

**II.4 Credit**

Parts and Labor as specified in II.1 and II. 3  
Note: Credit is only available on return of attached form.

## **II.5 Reference Documents**

WI-MSB-40-048, latest effective issue  
AMM Doc. No. 6.01.01-E latest effective issue  
Overhaul Manual Lycoming Direct Drive Aircraft Engines, Part No. 60294-7  
Precision Airmotive LLC Product Support Center Service Memorandum for the DA 40  
dated September 11, 2006.  
GARMIN EASA STC.IM.A.S.01023 (FAA STC SA01254WI)

## **III REMARKS**

1. Outside labor for repair of servo and flow divider must be carried out by a Precision Airmotive authorized service center that has been pre-approved by Diamond – list available from Diamond Aircraft Customer Support
2. All other measures must be carried out by manufacturer, a certified aircraft station or a certified aircraft mechanic
3. Accomplishment of the measures must be confirmed in the log book.
4. In case of any doubt, contact Diamond Aircraft Industries.



## Inspection Report for MSB 40-048

### AIRPLANE DATA

Airplane Serial Number: \_\_\_\_\_

Airplane Registration: \_\_\_\_\_

Hours of operation of airplane: \_\_\_\_\_

Typical operation of airplane: private, club, training, other \_\_\_\_\_

### MAINTENANCE DATA:

MSB carried out on: \_\_\_\_\_

MSB carried out by: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Findings from inspection carried out:

---

Date, Name, Sign

Please fax the completed form to Fax No. \*Fax: 1-800-934-3519, Email: or e-mail to [custsupp@diamondair.com](mailto:custsupp@diamondair.com).

# WORK INSTRUCTION

## WI-MSB-40.048/2

### INSPECTION FOR POSSIBLE CONTAMINATION OF ENGINE FUEL SYSTEM

#### **I GENERAL INFORMATION**

##### **I.1 Subject:**

Inspection of engine fuel system for possible contamination of fuel.

##### **I.2 Reference Documents:**

Diamond Aircraft DA40 Airplane Maintenance Manual, Doc. No. 6.02.01, latest effective issue.

Overhaul Manual Lycoming Direct Drive Aircraft Engines, Part No. 60294-7

##### **I.3 Remarks:**

- a) The work must be carried out by a certified aircraft service station or a certified aircraft maintenance mechanic. In case of doubt, contact Diamond Aircraft.
- b) All works, particular those that are not especially described in this work instruction, have to be carried out in accordance with the referenced maintenance manual.

#### **II DRAWINGS, SPECIAL TOOLS & MATERIALS**

##### **II.1 Drawings:**

GARMIN drawing 005-00304-00, sheet 9

##### **II.2 Special Tools:**

None.

### II.3 Materials:

Qty	Description	Part Number
1	Reduced flow fuel fitting	233-10010-01
1	O-ring, reduced flow fitting	MS29512-04
1	O-ring, Inlet fitting	951789
1	Gasket, fuel injector	66224
1	Gasket, air box	77504
4	Crush washers	STD475

## III INSTRUCTIONS

### Part I

1	Remove fuel injection servo (refer to AMM Section 73-00). Note: Disconnect and cap fuel hose to fuel pressure transducer. Note: Leave stainless steel mixture spring bracket attached to servo.
2	Note orientation of all fittings and mixture and throttle arms for purpose of reassembly.
3	Remove and discard reduced flow 90° fitting p/n 233-10010-01 at hose for fuel pressure transducer.(Refer to GARMIN drawing 005-00304-00, sheet 9)
4	Remove 90° inlet fitting p/n D41-7306-00-31 from servo.
5	Remove inlet filter strainer from servo.
6	Carefully inspect exterior surface of inlet filter and interior of servo for possible contamination (particulate matter). Report findings to Diamond Aircraft Customer Support Phone: 1-519-457-4041, Fax: 1-800-934-3519, Email: custsupp@diamondair.com.
7	Reinstall inlet filter strainer in servo.
8	Cap all openings in servo.
9	Disconnect and cap fuel hose and stainless steel fuel lines at flow divider.
10	Remove flow divider and cap openings.
11	Send servo and flow divider to a Precision Airmotive authorized service center for tear down inspection carried out in accordance with Precision Airmotive LLC Product Support Center Service Memorandum for the DA 40 dated September 11, 2006. Contact Diamond Aircraft Customer support for a list of Precision Airmotive authorized service centers that have been approved by Diamond for this repair. Phone: 1-519-457-4041, Fax: 1-800-934-3519, Email: custsupp@diamondair.com.

**Part II**

1	Uncap and flush fuel hose LS-12876-4S224 from top to bottom with clean and uncontaminated Varsol into a container. Note: Force the Varsol through the fuel hose by means of an oscillating light pressure (pressure jolts).
2	Blow out hose with clean, dry compressed air.
3	Repeat Steps 1 and 2 until no contamination is visible in the container.
4	Cap fuel hose.
5	Loosen/remove baffles as required for access to fuel injector nozzles and stainless steel lines (refer to AMM Section 73-00).
6	Uncap stainless steel lines and blow out from nozzle end to flow divider end with clean and uncontaminated Varsol into a container. Note: Force the Varsol through the stainless steel lines (reverse flow) by means of an oscillating light pressure (pressure jolts).
7	Blow out stainless steel lines with clean, dry compressed air.
8	Repeat Steps 1 and 2 until no contamination is visible in the container.
9	Remove and clean fuel injector nozzles (refer to Lycoming Overhaul Manual)
10	Cap stainless steel lines.
11	Connect stainless steel fuel lines to fuel injector nozzles. Note: Do not install injector nozzles into their respective cylinders Ref. Part IV below)

**Part III**

1	Install flow divider.
2	Connect stainless steel fuel lines, inlet fuel hose and vent hose to flow divider.
3	Reinstall 90° inlet fitting p/n D41-7306-00-31 with new O-Ring (P/N 951789) in servo.
4	Install new reduced flow 90° fitting p/n 233-10010-01 with new O-Ring (P/N MS29512-04) in servo.
5	Install fuel injection servo (refer to AMM Section 73-00).

**Part IV**

1	At each nozzle, install a good quality transparent measuring container (approx. 10 oz/300 ml). Note: Mark the respective cylinder number on each container.
2	<p>With the fuel selector on either tank, mixture rich and, full throttle, operate the electric fuel pump until the system supplies only fresh AVGAS and is bled of any trapped air. Empty the containers as often as necessary and properly discard their content of fuel.</p> <p>Reinstall the containers at each respective injector nozzles. Operate the electric fuel pump for approx. 1.5 to 2 minutes. The fuel stream at the nozzles shall be non-turbulent and laser beam type with no spillage through the nozzle vents. At the end of the flow check, it shall be determined that the ratio of the minimum volume container over the maximum volume container is above 0.95 (95%).</p> <p>Example:</p> <p>Cyl. No. 1: 6.125 oz          Cyl. No. 2: 6.000 oz          Cyl. No. 3: 5.870 oz          Cyl. No. 4: 5.870 oz</p> <p><math>V_{MIN} = 5.870 \text{ oz}</math>  <math>V_{MAX} = 6.125 \text{ oz}</math></p> <p><math>V_{MIN} / V_{MAX} = 0.9584 = 95.84\% &gt; 95\% \rightarrow \text{OK}</math></p> <p>A lower value than 0.95 (95%) may be indicative that the injector nozzles/lines assy corresponding to the minimum volume containers may still be partially clogged. Contact Diamond Aircraft Customer Support at the above coordinates for any lower value.</p>
3	Remove the measuring containers and, properly discard their content of fuel
4	If the above test is satisfactory, reinstall the injector nozzles into their respective cylinders.
5	Reinstall/tighten baffles (refer to AMM Section 73-00).
6	Carry out ground run and, as necessary, adjust idle speed and idle mixture (refer to AMM Section 71-00).
7.	Carry out the return to service in accordance with the requirements of the country of registry of the aircraft.





## Product Support Center Service Memorandum

September 11, 2006

### Supplemental Information for Cleaning Diamond Aircraft DA40 Servos P/N 2576586-1 and Flow Divider P/N 2576564-1 With Suspect Metal Shaving Contamination.

#### Description of Issue:

Servo's 2576586-1 installed on Diamond Aircraft DA40 have fittings manufactured and installed by Diamond Aircraft. The fittings, when installed, could have had metal shavings in them. The shavings may have migrated through the servo, flow divider, fuel lines, and nozzles. Fuel lines and nozzles will be cleaned in the field. The flow divider and servos will be cleaned by repair centers.

The suspect fitting is the 90 degree fuel pressure restricted port fitting. The shavings may be on the inside or outside of the parts.

If the servo (2576586-1) or flow divider (2576564-1) used on Diamond Aircraft DA40 are received for suspected contamination, please follow the service instructions in the applicable Precision Airmotive Service Manual. Specifically, the servo & flow dividers need to be completely taken apart. Every part needs to be cleaned and then inspected to insure no contamination is present. The method of cleaning depends on the component in question. The cleaning of the components shall be per the appropriate service manual.

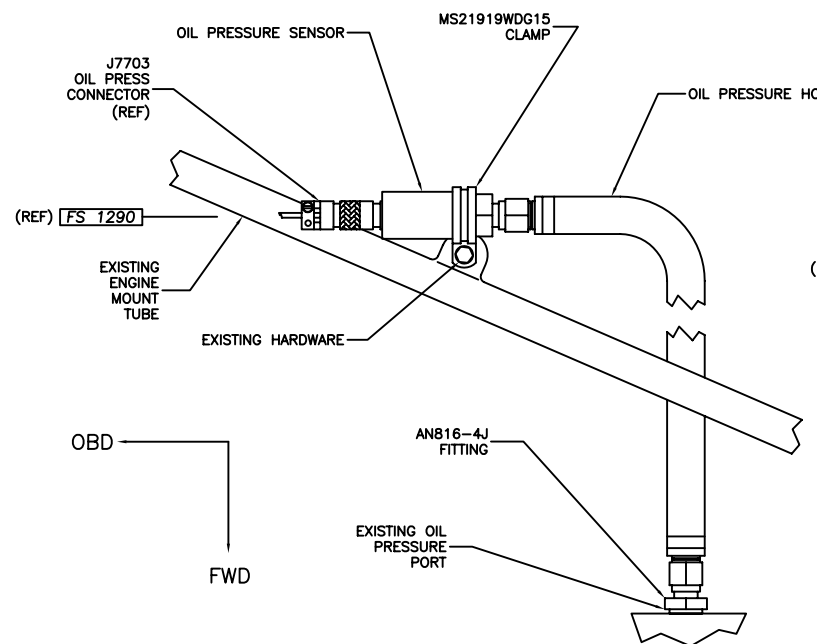
#### Areas of Special interest:

1. The suspect fuel pressure fitting should have been removed when the servo was removed from the aircraft. It shall not be reused unless specifically authorized by Diamond Aircraft.
2. When cleaning the main body of the servo ensure that ALL fuel passageways especially the UN-metered passageways are cleaned, flushed, and unobstructed.
3. The diaphragms shall be gently flexed where the rubber meets the metal washer to look for hidden chips. Carefully check the diaphragms for damage. If there is any question about the condition of the diaphragm, it should be replaced.
4. The mixture control lever assembly can house hidden contaminants because of the number and type of parts that are assembled. Carefully inspect each part after complete disassembly.
5. The fuel pressure fitting installed by Diamond mentioned previously, need to be thoroughly probed, cleaned and inspected.
6. ALL fittings and plugs in the flow divider need to be removed. Behind each of the fittings a small pocket may exist where chips can hide. All small holes in the flow divider need to be cleaned, flushed and inspected to ensure no chips are in the small passageways.

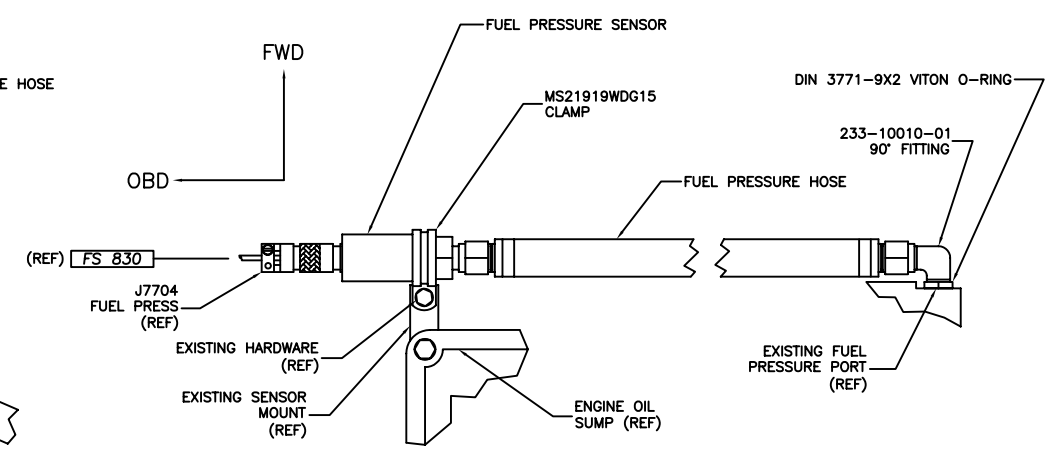
If you have any questions or concerns please contact Precision Airmotive Product support at (360)651-8282

FSC Memo 091105.doc

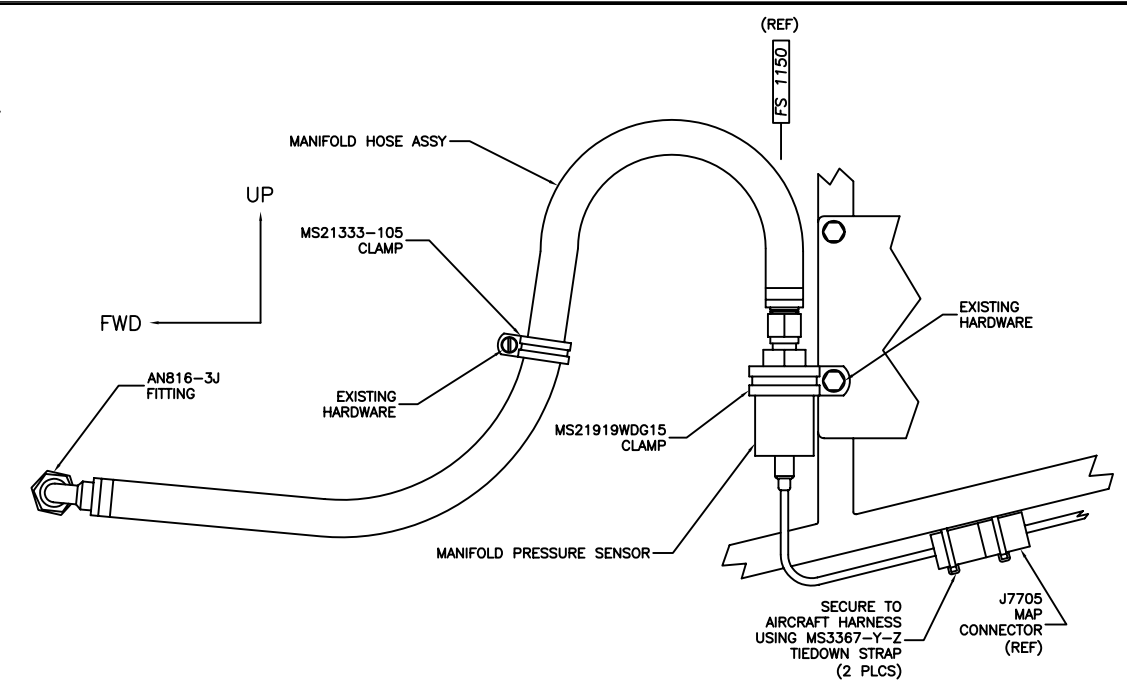
14800 40<sup>th</sup> Avenue N.E. • Marysville, WA. 98271 • USA • Phone: (360) 651-8282 • Fax: (360) 651-8080



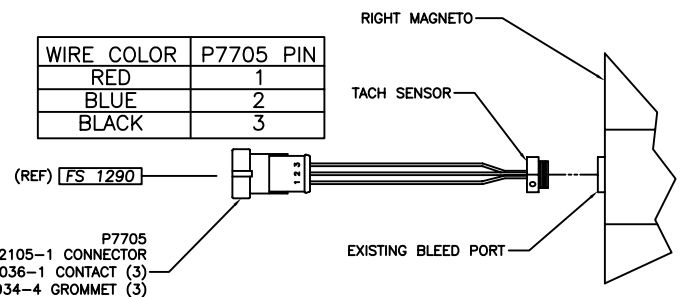
OIL PRESSURE SENSOR  
(VIEW LOOKING DN)



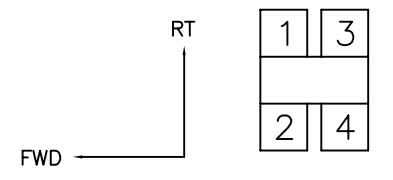
FUEL PRESSURE SENSOR  
(VIEW LOOKING UP)



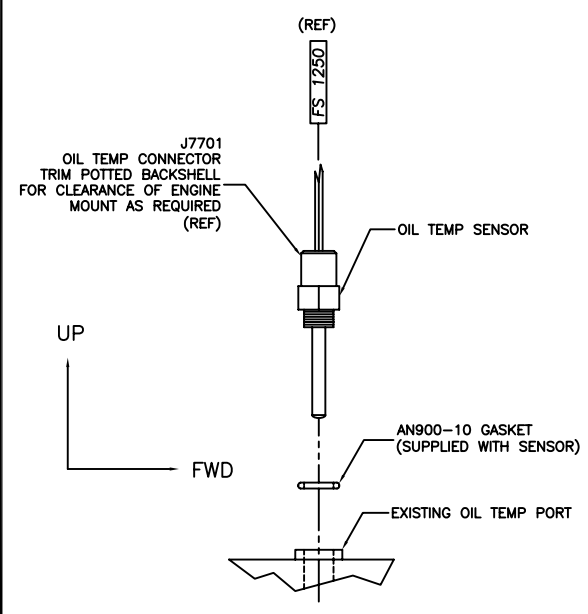
MANIFOLD PRESSURE SENSOR  
(VIEW LOOKING RT)



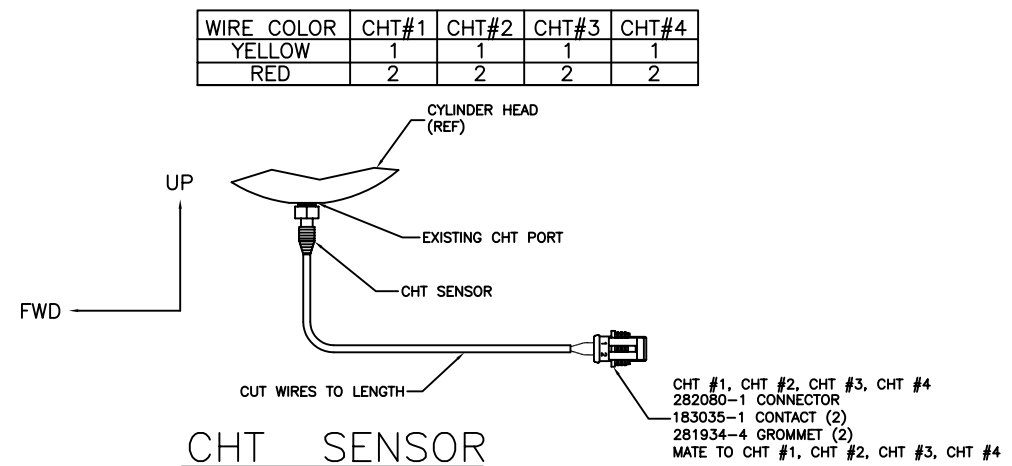
TACH SENSOR  
(VIEW LOOKING DN)



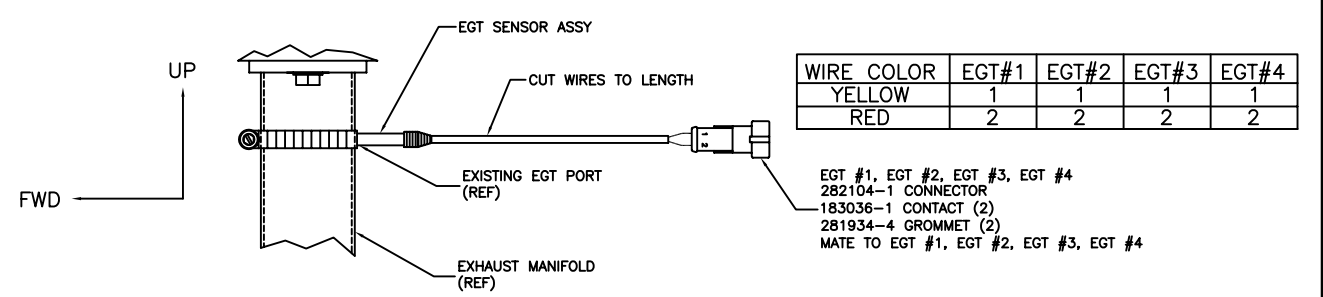
ENGINE CYLINDERS  
(VIEW LOOKING DN)



OIL TEMP SENSOR  
(VIEW LOOKING LT)



CHT SENSOR  
(TYP 4 PLCS)



EGT SENSOR  
(TYP 4 PLCS)

DETAIL H  
ENGINE COMPARTMENT SENSORS  
◆ DA 40 ONLY (REF NOTE 20)

**GARMIN**®  
Garmin Ltd. or its subsidiaries  
c/o Garmin International, Inc.  
1200 E. 151st Street  
Olathe, Kansas 66062 U.S.A.

SIZE <b>B</b>	DWG. NO. 005-00304-00	REV. 10
SCALE NONE	SHT. 9 OF 15	

## SERVICE INFORMATION NO. SI 40-041

**NOTE:** SI's are used **only**.  
1) To distribute information from DAI to our customers.  
2) To distribute applicable information / documents from our suppliers to our customers with additional information.  
Typically there is no revision service for SI's. Each new information or change of that will be send along with a new SI.

### I. TECHNICAL DETAILS

#### 1.1 Airplanes affected:

DA 40 with Garmin G1000 EASA STC.IM.A.S.01023 (FAA STC SA01254WI) installed, with less than 50 hrs total time

S/N 40.448 through 40.673, excluding: 40.538, 40.590, 40.641, 40.642, 40.644, 40.651, 40.654, 40.655 and 40.669

#### 1.2 Subject:

EASA AD No.: 2006 – 0295-E for  
Engine – Contamination of the Engine Fuel System – Inspection  
ATA-Code: 72

#### 1.3 Reason:

EASA has issued an Airworthiness Directive requiring the inspection of the engine fuel system because on some aircraft's engine fuel system indicating system was contaminated with particles from the manufacturing process. This work has to be accomplished in compliance with the MSB mentioned in the AD.


#### 1.4 Information:

For detailed technical information see EASA Airworthiness Directive No.: 2006 – 0295-E which is applicable without any further additions or restrictions.

### II. OTHERS

The EASA Airworthiness Directive AD No.: 2006 – 0295-E is attached to this SI.

In case of doubt contact Diamond Aircraft Industries.

<b>EASA</b>	<b>EMERGENCY AIRWORTHINESS DIRECTIVE</b>	
	<p><b>AD No.: 2006 – 0295-E</b></p> <p><b>Date: 26 September 2006</b></p>	
No person may operate an aircraft to which an Airworthiness Directive applies, except in accordance with the requirements of that Airworthiness Directive unless otherwise agreed with the Authority of the State of Registry.		
<b>Type Approval Holder's Name :</b>	<b>Type/Model designation(s) :</b>	
Diamond Aircraft Industries GmbH	DA 40	
TCDS Number: EASA.A.022		
Foreign AD : not applicable		
Supersedure : not applicable		
<b>ATA 72</b>		
<b>Engine – Contamination of the Engine Fuel System - Inspection</b>		
Manufacturer:	Diamond Aircraft Industries Inc., Canada	
Applicability:	DA 40 with Garmin G1000 EASA STC.IM.A.S.01023 (FAA STC SA01254WI) installed, with less than 50 Hrs total time, Serial Numbers 40.448 through 40.673, excluding 40.538, 40.590, 40.641, 40.642, 40.644, 40.651, 40.654, 40.655 and 40.669	
Reason:	During production installation of the Garmin G1000 STC some parts of the installed fuel system indicating system were contaminated with particles from the manufacturing process.  This may lead to improper engine operation, power loss or in-flight engine failure.  Diamond Aircraft Industries mandated with MSB 40-048 a one time special inspection and rectification for the effected airplanes.	
Effective Date:	28 September 2006	
Compliance:	Inspection: Inspection as per Diamond MSB 40-048/2 has to be carried before the next flight but not later than 30 November 2006.	

Ref. Publications:	Diamond Aircraft Industries Mandatory Service Bulletin, MSB 40-048/2 or later approved revisions.
Remarks :	<ol style="list-style-type: none"><li>1. If requested and appropriately substantiated the responsible EASA manager for the related product has the authority to accept Alternative Methods of Compliance (AMOCs) for this AD.</li><li>2. The safety assessment has requested not to implement the full consultation process and an immediate publication and notification.</li><li>3. Enquiries regarding this AD should be addressed to Mr. M. Capaccio, Airworthiness Directive Focal Point - Certification Directorate, EASA. E-mail: <a href="mailto:ADs@easa.europa.eu">ADs@easa.europa.eu</a></li><li>4. For any question concerning the technical content of the requirements in this AD, please contact Diamond Aircraft Industries Ph.: +43 2622 26700 ; Fax: +43 2622 26780 E-mail: <a href="mailto:office@diamond-air.at">office@diamond-air.at</a></li></ol>