77

ENGINE INDICATING

LIST OF EFFECTIVE PAGES

CHAPTER	PAGE	DATE	CHAPTER	PAGE	DATE
77-LEP (BA)	1	NOV 09			
	2	JUL 99			
77-TC (BA)	1	JUL 99			
	2	JUN 01			
77-00-00 (BA)	1	JUL 99			
	2	JUL 99			
77-10-00 (AM)	1	JUL 99			
	2	JUL 99			
77-10-00 (BA)	1	JUL 99			
	2	JUL 99			
	3	JUL 99			
	4	JUL 99			
77-10-01 (CA)	201	JUL 99			
	202	JUL 99			
	203	JUL 99			
	204	JUL 99			
77-10-01 (EA)	201	JUL 99			
	202	JUL 99			
	203	JUL 99			
	204	JUL 99			
77-10-02 (AM)	201	JUL 99			
	202	JUL 99			
77-20-00 (BA)	1	JUN 01			
	2	JUN 01			
77-20-00 (BA)	201	NOV 09			
	202	JUN 01			

CHAPTER	PAGE	DATE	CHAPTER	PAGE	DATE

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TABLE OF CONTENTS

ENGINE INDICATING

DESCRIPTION AND OPERATION

1. GENERAL

This chapter deals with the engine parameters required for correct flight progress. It includes two sections :

- the "power" section, which informs the user about engine operation – refer to 77–10–00,
- the "temperature" section, which informs the user about engine temperature – refer to 77–20–00.

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POWER

DESCRIPTION AND OPERATION

1. GENERAL

This section deals with the engine indicators which give indications, either directly or indirectly, on engine operation.

The main elements are :

- tachometer indicator,
- tachometer control,
- manifold pressure indicator (option),
- manifold pressure filter (option).

2. LOCATION (Figure 1)

COMPONENT	QTY	AREA	ACCESS DOOR	REFERENCE
Tachometer indicator	1	200	/	77–10–00
Tachometer control	1	100	121	77–10–00
Manifold pressure indicator (option)	1	200	/	77–10–00
Manifold pressure filter (option)	1	100	121	77–10–02

3. DESCRIPTION

A. Tachometer indicator

Located on the instrument panel, this element receives information from the tachometer sensor and transmits information relative to the engine rotation speed to the pilot.

It is supplied by bus 1 bar.

B. Tachometer control

The tachometer control links the power plant and the tachometer indicator ; it transmits the rotation movement of the power plant tachometer connector to the indicator. It is composed of a sheath in which a cable, with a square section at the end, is driven by the tachometer connector. Each of its terminations has a threaded end.

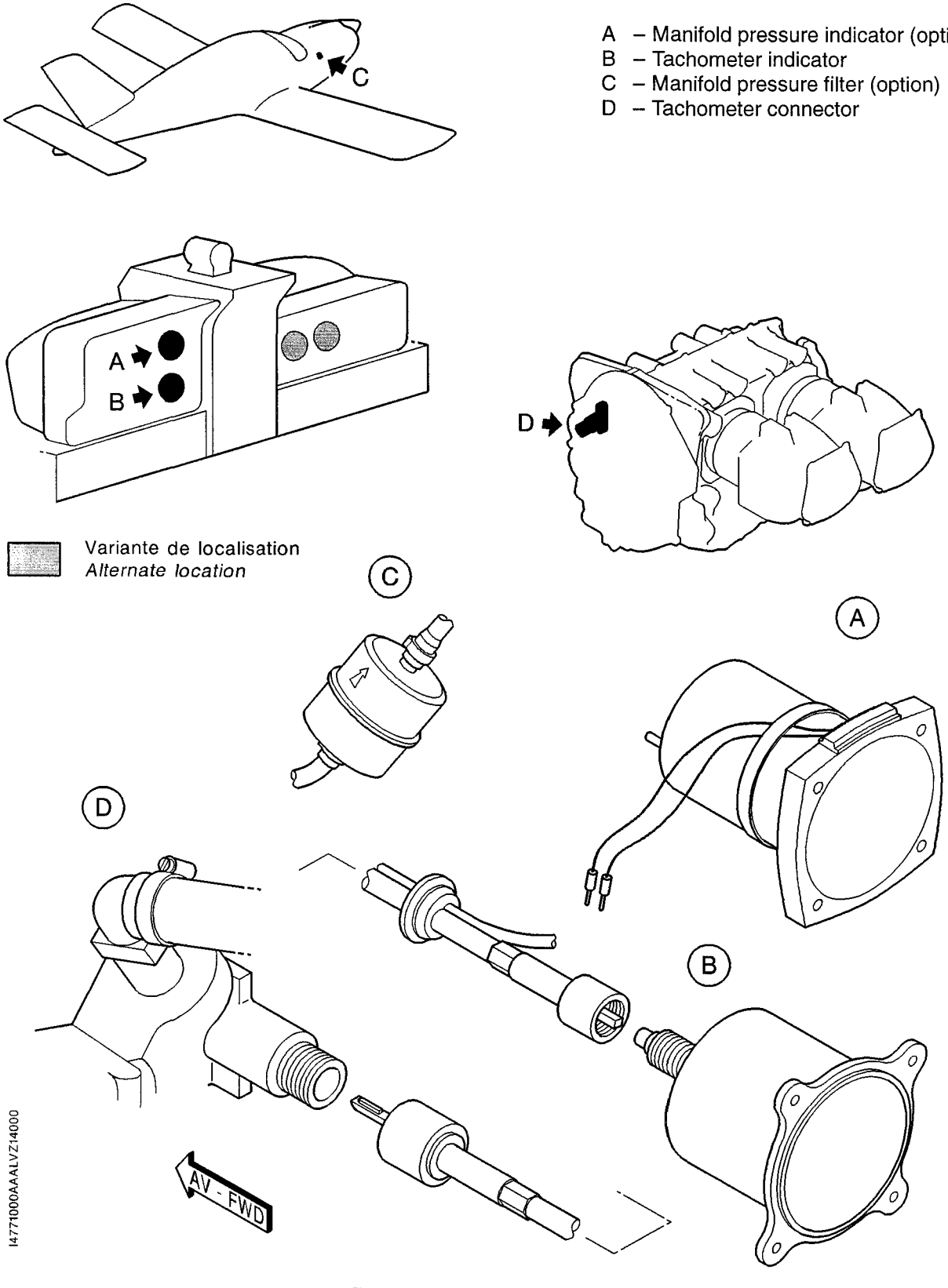
C. Manifold pressure indicator (option)

The indicator is located on the instrument panel. It is linked by a pipe to the pressure inlet which is connected to the R.H. rear cylinder and transmits all the changes of pressure to the pilot.

D. Manifold pressure filter (option)

Located on the pipe which links the indicator and the pressure inlet, this element filters the air arriving at the manifold pressure indicator.

A – Manifold pressure indicator (option)
B – Tachometer indicator
C – Manifold pressure filter (option)
D – Tachometer connector



Power – Location of components
Figure 1

POWER

DESCRIPTION AND OPERATION

1. GENERAL

This section deals with the engine indicators which give indications, either directly or indirectly, on engine operation.

The main elements are :

- tachometer indicator,
- tachometer sensor.

2. LOCATION (Figures 1 and 1A)

COMPONENT	QTY	AREA	ACCESS DOOR	REFERENCE
Tachometer indicator	1	200	/	77–10–00
Tachometer sensor	1	100	121	77–10–01

3. DESCRIPTION

A. Tachometer indicator

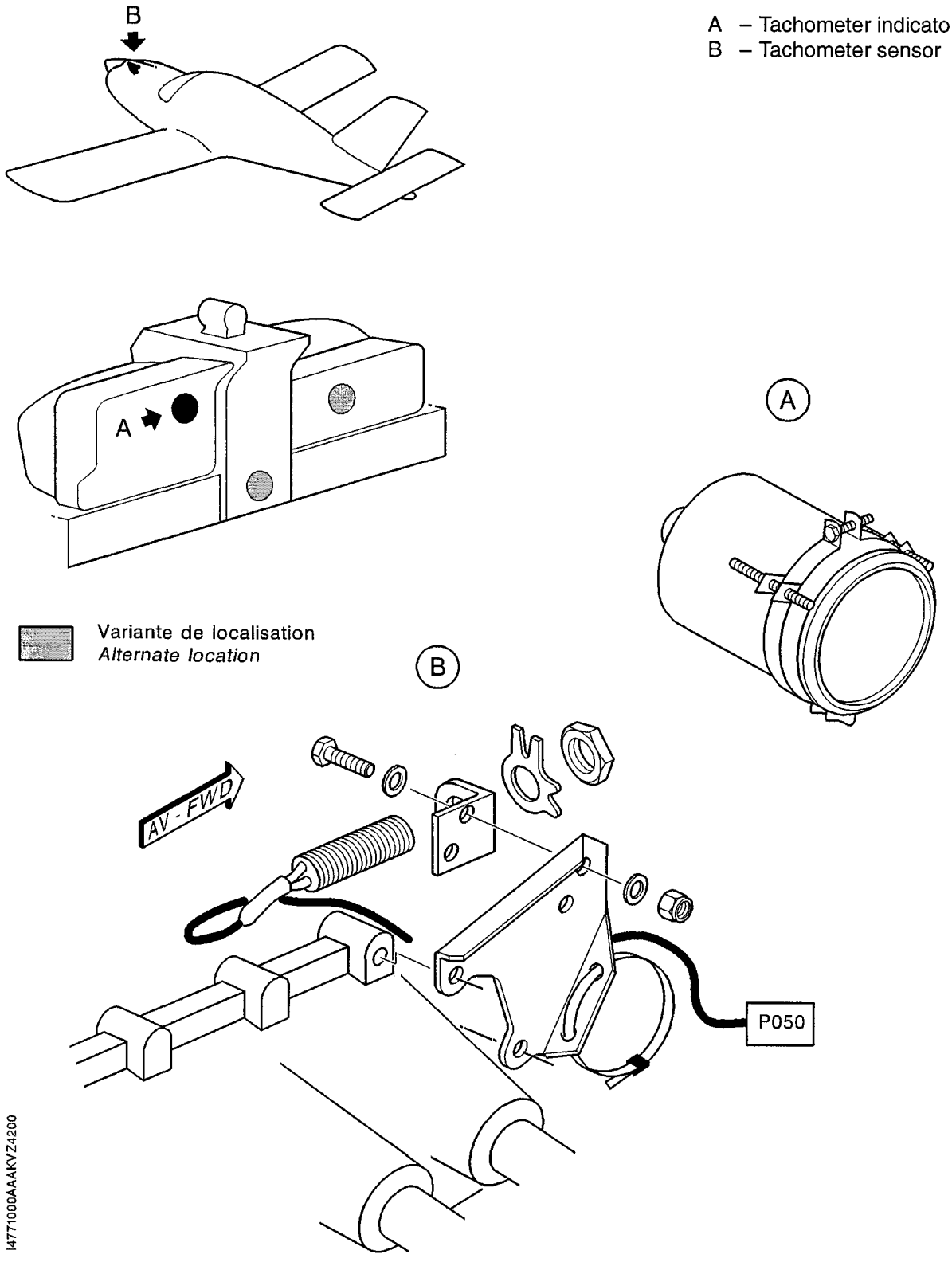
Located on the instrument panel, this element receives information from the tachometer sensor and transmits information relative to the engine rotation speed to the pilot.

It is supplied by bus 1 bar.

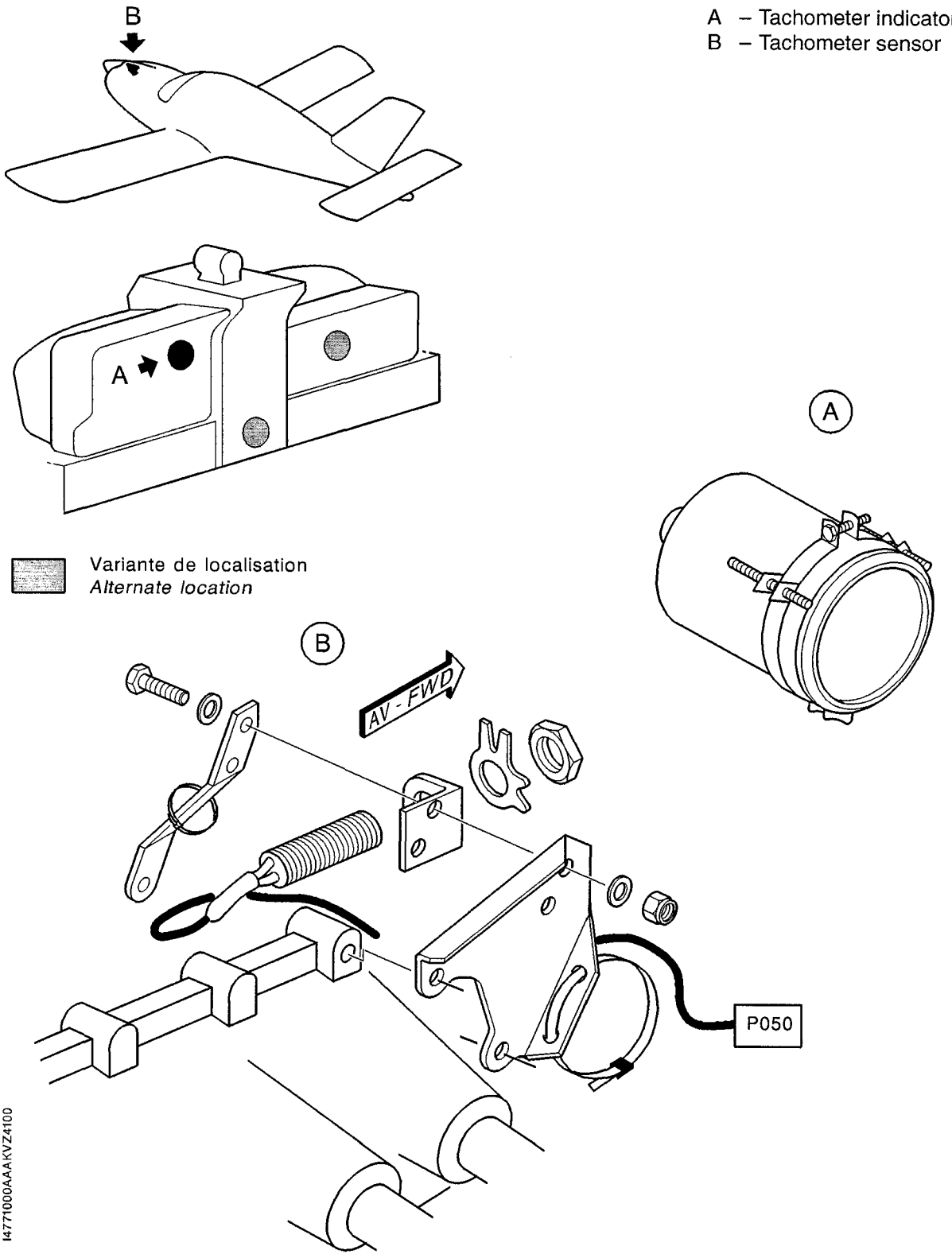
B. Tachometer sensor

Located on the upper part of the engine at the starter ring, it senses the rotation speed of the latter and transmits the information to the tachometer indicator.

It is supplied by bus 1 bar.



Power – Location of components
Figure 1 – Pre–MOD. 113



Power – Location of components
Figure 1A – Post–MOD. 113

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TACHOMETER

MAINTENANCE PRACTICES

1. SERVICING – TACHOMETER SENSOR

None

2. REMOVAL / INSTALLATION – TACHOMETER SENSOR (Figures 201 and 202)

A. Tools and consumable materials

- Loctite (TB 08–013C)
- Tie–wraps
- Torque wrench 0 – 177 lbf.in (0 – 20 N.m)
- Shim set 0.01 to 0.04 in (0.3 to 1 mm)
- Wire brush

B. Removal of the tachometer sensor

WARNING : PRIOR TO ANY OPERATION, ENSURE THAT THE ENGINE, EXHAUST PIPE AND MANIFOLDS ARE COLD. IF NOT, TAKE NECESSARY PRECAUTIONS TO AVOID SEVERE BURNS.

WARNING : PRIOR TO ANY OPERATION, ENSURE THAT THE KEY IS REMOVED FROM MAGNETO SELECTOR AND THAT "MAIN SWITCH" IS OFF.

1) Remove engine cowling 121 – refer to 71–10–01.
2) Disconnect the battery – refer to 24–30–02.
3) Cut tie–wraps (9).
4) Disconnect connector (13).
5) Unlock and remove nut (5), lockwasher (4) and sensor (16). Discard lockwasher (4).
6) If necessary, remove bracket (6).
   a) Remove nuts (15), lockwashers (14) and washers (11). Discard lockwashers (14).
   b) Remove bracket (6) assembly, bolts (10), washers (11) and spacers (12), if installed.
7) If necessary, remove nuts (8), washers (2) and (7), angle (3) and bolts (1). Discard nuts (8).

C. Installation of the tachometer sensor

1) If removed, position angle (3) on bracket (6). Attach it with bolts (1), washers (2) and (7) and new nuts (8). Do not tighten.
2) If removed, install bracket (6).
   a) Check bracket (6) for cracks and inspect the interfaces for cleanliness.
   b) Using a wire brush, clean bolt (10) thread.
   c) Coat bolt (10) thread with loctite (TB 08–013C).

d) Position bracket (6) assembly and attach it with bolts (10), washers (11), spacers (12), if installed, new lockwashers (14) and nuts (15).

e) Torque – refer to 20–00–01.

3) Screw sensor (16) on angle (3).

4) Install new lockwasher (4) and screw nut (5).

5) Adjust angle (3) position ; sensor (16) core axis shall be at 0.039 in (1 mm) below circle formed by starter ring (21) tooth upper side – refer to Figure 202.

6) Lock nuts (8).

7) Adjust sensor (16) position ; the gap between the sensor and the nearest point from starter ring (21) rear side shall be equal to 0.016 in (+ 0.008 ; – 0.004) [0.4 mm (+ 0.2 ; – 0.1)] – refer to Figure 202, Detail A.

NOTE : Taking into account crankshaft slack, pull on propeller blade shanks before checking the maxi dimension and push before checking the mini dimension.

8) Lock the sensor with nut (5).

9) Safety the nut with lockwasher (4).

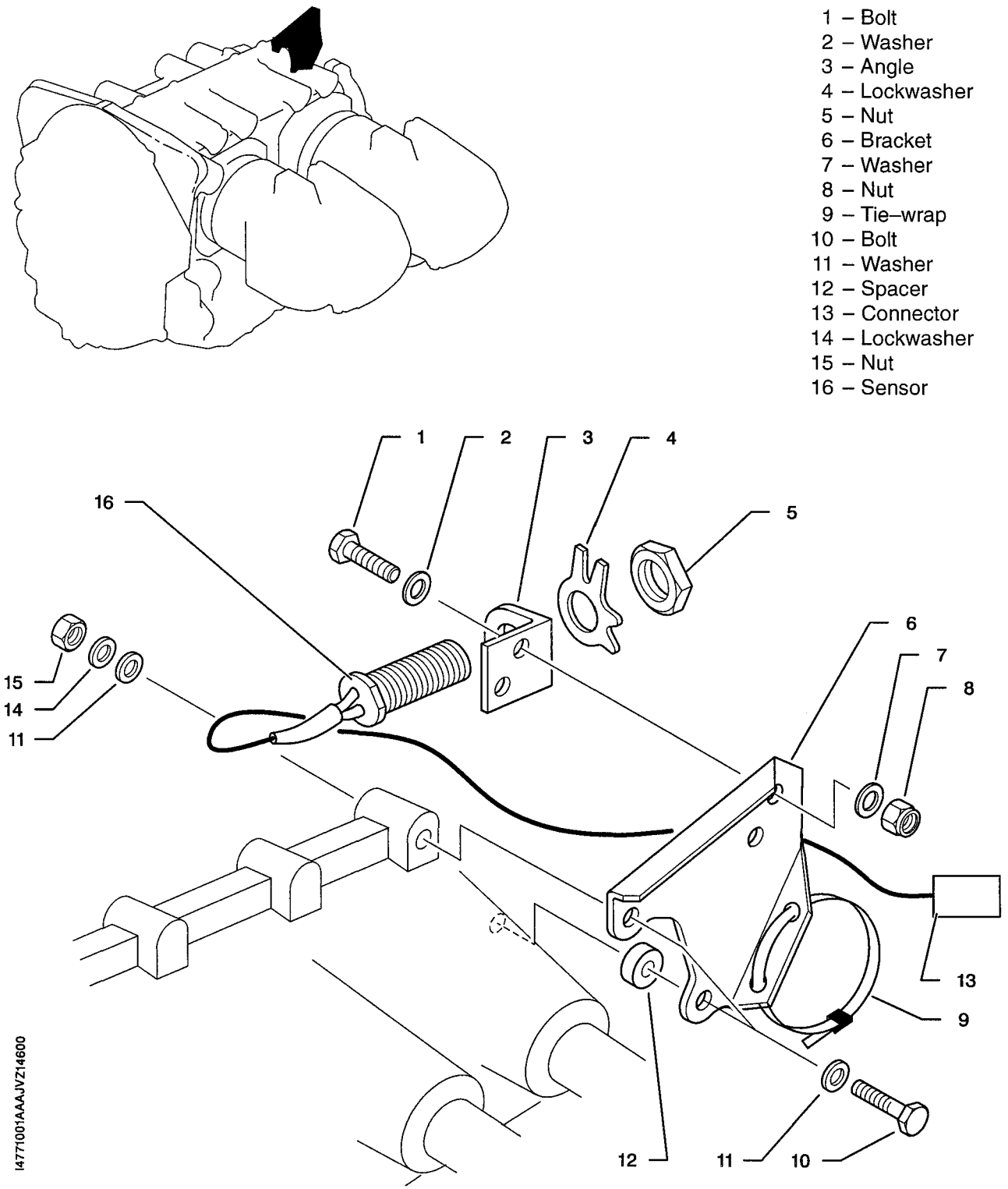
10) Connect and bind connector (13) with tie–wraps (9).

11) Connect the battery – refer to 24–30–02.

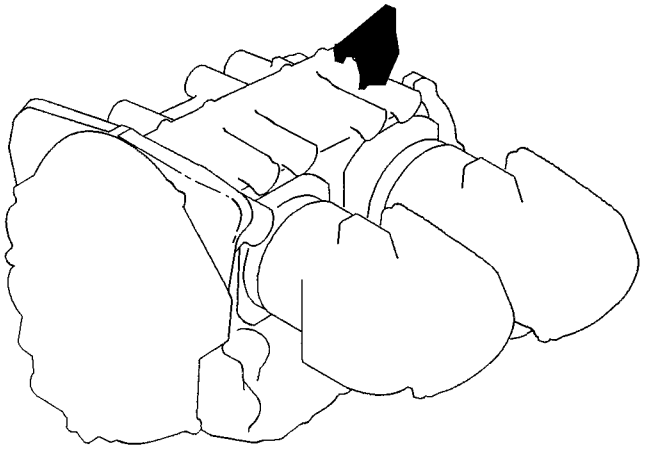
12) Make sure all the tools and materials are removed and the work area is clean and free from debris.

13) Install engine cowling 121 – refer to 71–10–01.

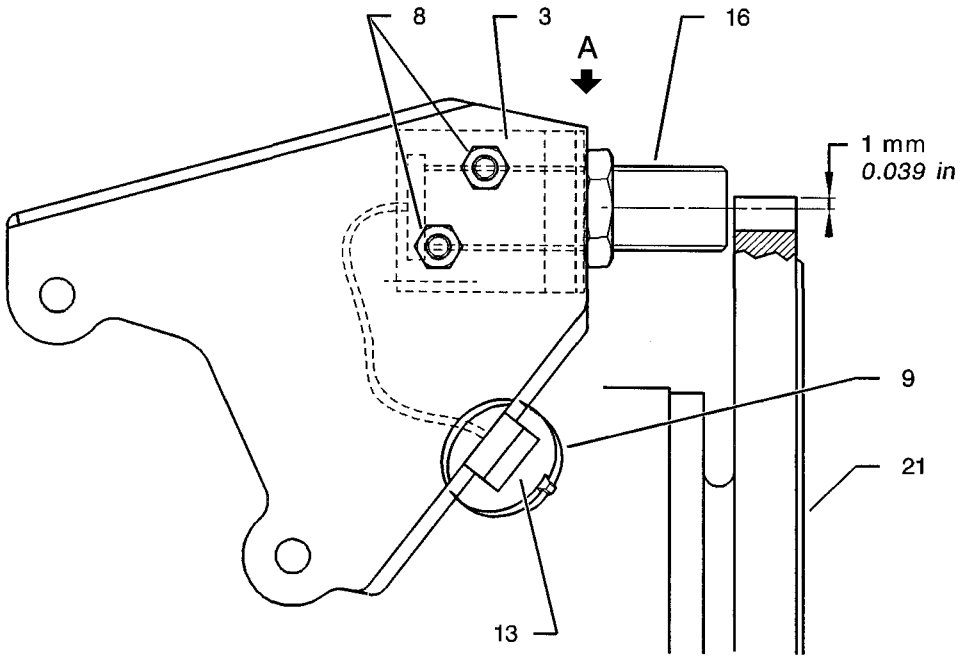
14) Perform a test run–up – refer to 05–30–02.

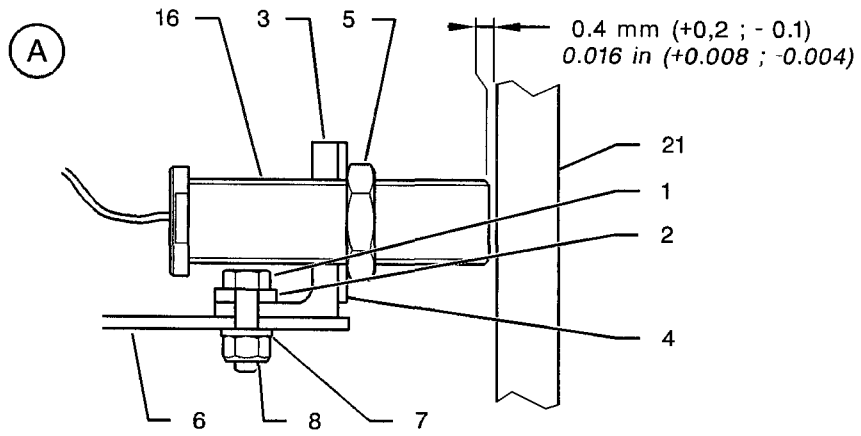


Tachometer sensor – Removal / Installation
Figure 201



1 – Bolt
2 – Washer
3 – Angle
4 – Lockwasher
5 – Nut
6 – Bracket
7 – Washer
8 – Nut
9 – Tie–wrap
13 – Connector
16 – Sensor
21 – Starter ring





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Tachometer sensor – Removal / Installation
Figure 202

TACHOMETER

MAINTENANCE PRACTICES

1. SERVICING – TACHOMETER SENSOR

None

2. REMOVAL / INSTALLATION – TACHOMETER SENSOR (Figures 201 and 202)

A. Tools and consumable materials

- Loctite (TB 08–013C)
- Tie–wraps
- Torque wrench 0 – 177 lbf.in (0 – 20 N.m)
- Shim set 0.01 to 0.04 in (0.3 to 1 mm)
- Wire brush

B. Removal of the tachometer sensor

WARNING : PRIOR TO ANY OPERATION, ENSURE THAT THE ENGINE, EXHAUST PIPE AND MANIFOLDS ARE COLD. IF NOT, TAKE NECESSARY PRECAUTIONS TO AVOID SEVERE BURNS.

WARNING : PRIOR TO ANY OPERATION, ENSURE THAT THE KEY IS REMOVED FROM MAGNETO SELECTOR AND THAT "MAIN SWITCH" IS OFF.

1) Remove engine cowling 121 – refer to 71–10–01.
2) Disconnect the battery – refer to 24–30–02.
3) Cut tie–wraps (10) and (22).
4) Disconnect connector (32).
5) Unlock and remove nut (6), lockwasher (5) and sensor (3). Discard lockwasher (5).
6) If necessary, remove bracket (7).
   a) Remove nuts (13), lockwashers (12) and washers (11). Discard lockwashers (12).
   b) Remove nuts (9), washers (8), angle (4) and bolts (1). Discard nuts (9) and remove bracket (7).
7) If necessary, remove strut (2).
   a) Remove washers (14), nuts (15) and washers (16).
   b) Remove bolts (20) and (21), washers (17), strut (2), setting washers (19), if installed, and spacer (18).

   NOTE : Note the number of setting washers (19) in order to ensure a proper installation.

C. Installation of the tachometer sensor

1) If removed, install strut (2).
   a) Using a wire brush, clean bolt (20) and (21) thread.
   b) Check bracket (7) for cracks and inspect the interfaces for cleanliness.

c) Install bolt (20) and a washer (17) into the upper hole.

NOTE : Bolt (20) is shorter than bolt (21).

d) Attach strut (2) with bolt (21), a washer (17), setting washers (19), if removed, and spacer (18).

e) Coat bolts (20) and (21) thread with loctite (TB 08–013C).

f) Install washers (16) and nuts (15). Torque – refer to 20–00–01.

2) If removed, install bracket (7).

a) Position a washer (14) on bolts (20) and (21), then bracket (7).

b) Install washers (11), new lockwashers (12) and nuts (13). Do not tighten.

c) Slide angle (4) between bracket (7) and strut (2). Make sure that strut (2) is not stressed.

NOTE : Taking into account machining dimension of engine unit support and in case of strut (2) stress, install setting washers (19) between strut (2) and spacer (18) to ensure correct tightening and to avoid strut (2) stress (6 washers maximum).

d) Align the holes of strut (2) and angle (4) with those of bracket (7). Install bolts (1), washers (8) and new nuts (9). Do not tighten.

e) Slightly unscrew nuts (13) and coat the thread with loctite (TB 08–013C).

f) Torque – refer to 20–00–01.

3) Screw sensor (3) on angle (4).

4) Install new lockwasher (5) and screw nut (6).

5) Adjust angle (4) position ; sensor (3) core axis shall be at 0.039 in (1 mm) below circle formed by starter ring (31) tooth upper side – refer to Figure 202.

6) Lock nuts (9).

7) Adjust sensor (3) position ; the gap between the sensor and the nearest point from starter ring (31) rear side shall be equal to 0.016 in (+ 0.008 ; – 0.004) [0.4 mm (+ 0.2 ; – 0.1)] – refer to Figure 202, Detail A.

NOTE : Taking into account crankshaft slack, pull on propeller blade shanks before checking the maxi dimension and push before checking the mini dimension.

8) Lock the sensor with nut (6).

9) Safety the nut with lockwasher (5).

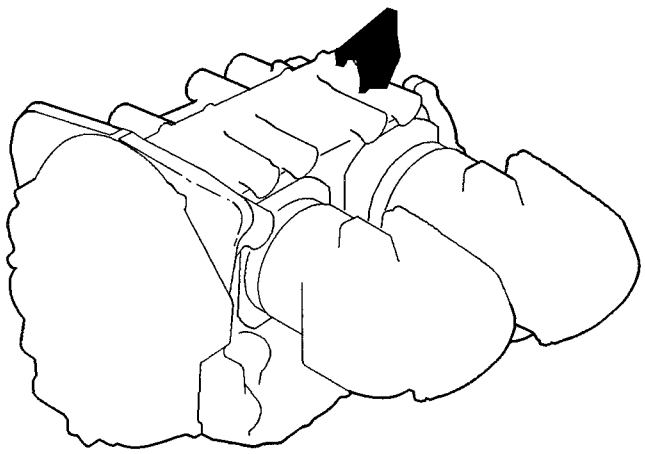
10) Connect and bind connector (32) with tie–wraps (10) for the connector and with tie–wraps (22) for wiring.

11) Connect the battery – refer to 24–30–02.

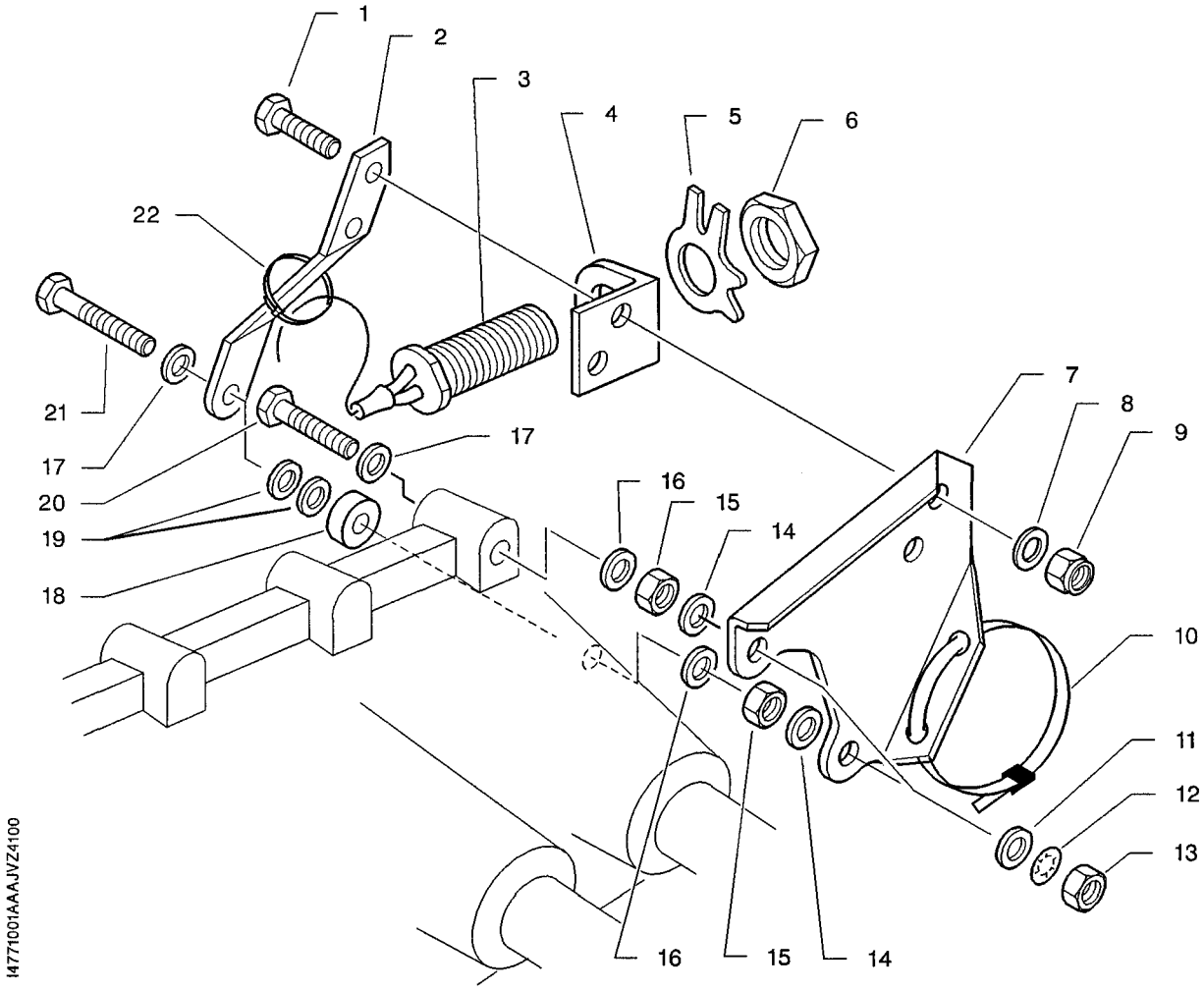
12) Make sure all the tools and materials are removed and the work area is clean and free from debris.

13) Install engine cowling 121 – refer to 71–10–01.

14) Perform a test run–up – refer to 05–30–02.

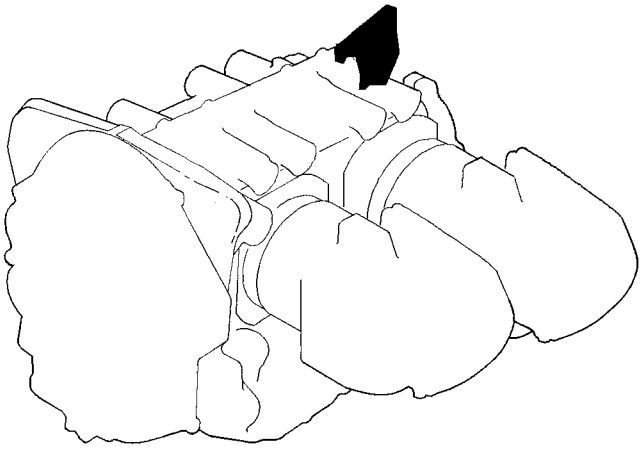


1 – Bolt
2 – Strut
3 – Sensor
4 – Angle
5 – Lockwasher
6 – Nut
7 – Bracket
8 – Washer
9 – Nut
10 – Tie–wrap
11 – Washer
12 – Lockwasher
13 – Nut
14 – Washer
15 – Nut
16 – Washer
17 – Washer
18 – Spacer
19 – Washer
20 – Bolt
21 – Bolt
22 – Tie–wrap

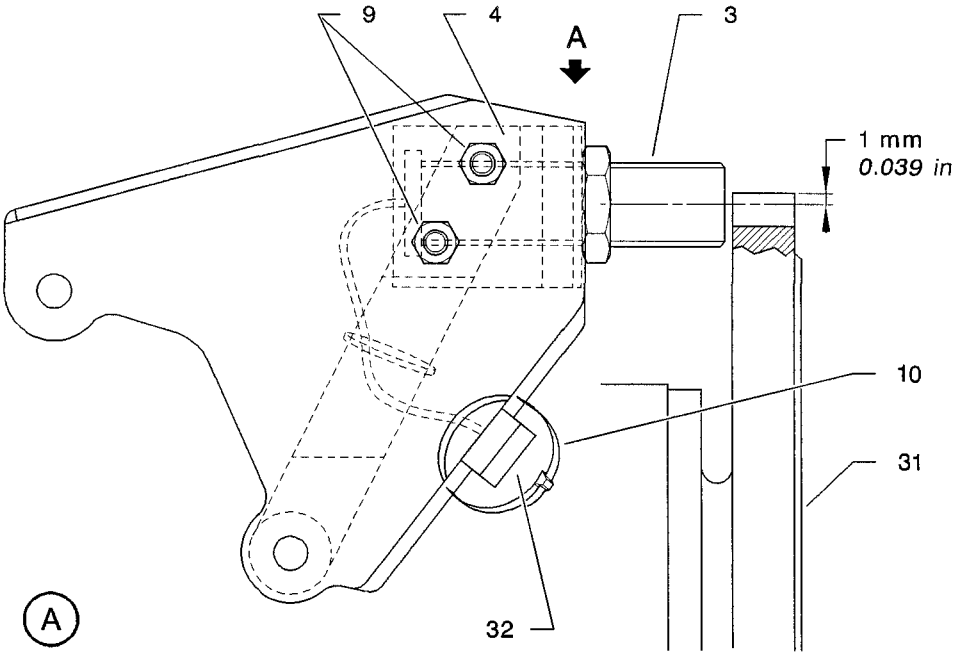


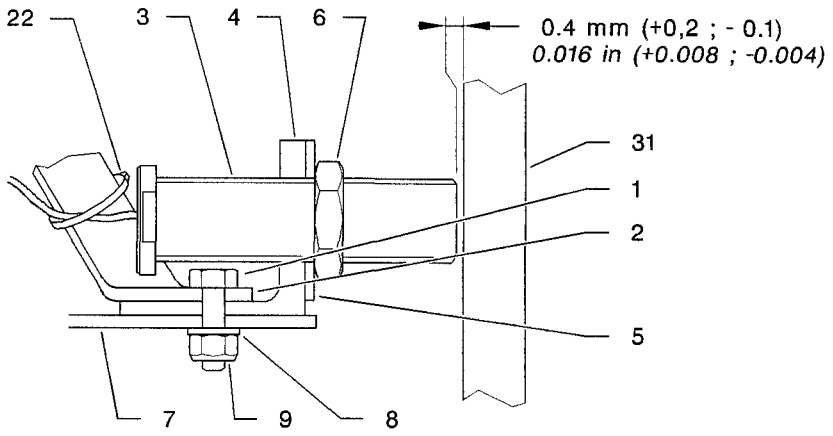
Tachometer sensor – Removal / Installation
Figure 201

AEAE
Validity : Post–MOD. 113 or Kit OPT10 921800



1 – Bolt
2 – Strut
3 – Sensor
4 – Angle
5 – Lockwasher
6 – Nut
7 – Bracket
8 – Washer
9 – Nut
10 – Tie–wrap
22 – Tie–wrap
31 – Starter ring
32 – Connector





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Tachometer sensor – Removal / Installation
Figure 202

MANIFOLD PRESSURE

MAINTENANCE PRACTICES

1. SERVICING – MANIFOLD PRESSURE FILTER

None

2. REMOVAL / INSTALLATION – MANIFOLD PRESSURE FILTER (Figure 201)

A. Tools and consumable materials

- Blanking caps
- CLIC pliers Z00.N7675230202

B. Removal of the manifold pressure filter

WARNING : PRIOR TO ANY OPERATION, ENSURE THAT THE ENGINE, EXHAUST PIPE AND MANIFOLDS ARE COLD. IF NOT, TAKE NECESSARY PRECAUTIONS TO AVOID SEVERE BURNS.

WARNING : PRIOR TO ANY OPERATION, ENSURE THAT THE KEY IS REMOVED FROM MAGNETO SELECTOR AND THAT "MAIN SWITCH" IS OFF.

1) Remove engine cowling 121 – refer to 71–10–01.
2) Cut and discard clamps (3) and (5) from hoses (2) and (6).
3) Remove filter (4) and hoses (2) and (6). Blank off.

C. Installation of the manifold pressure filter

1) Check the condition of hoses. Replace them if necessary.
2) Remove the blanking caps and engage new clamps (3) and (5) onto hoses (2) and (6).
3) Position the filter, the arrow directed towards indicator (1) and connect hoses (2) and (6).
4) Position and tighten clamps (3) and (5) using the CLIC pliers.
5) Install engine cowling 121 – refer to 71–10–01.
6) Start the engine and check that indicator operates correctly.

3. ADJUSTMENT / TEST – MANIFOLD PRESSURE FILTER

None

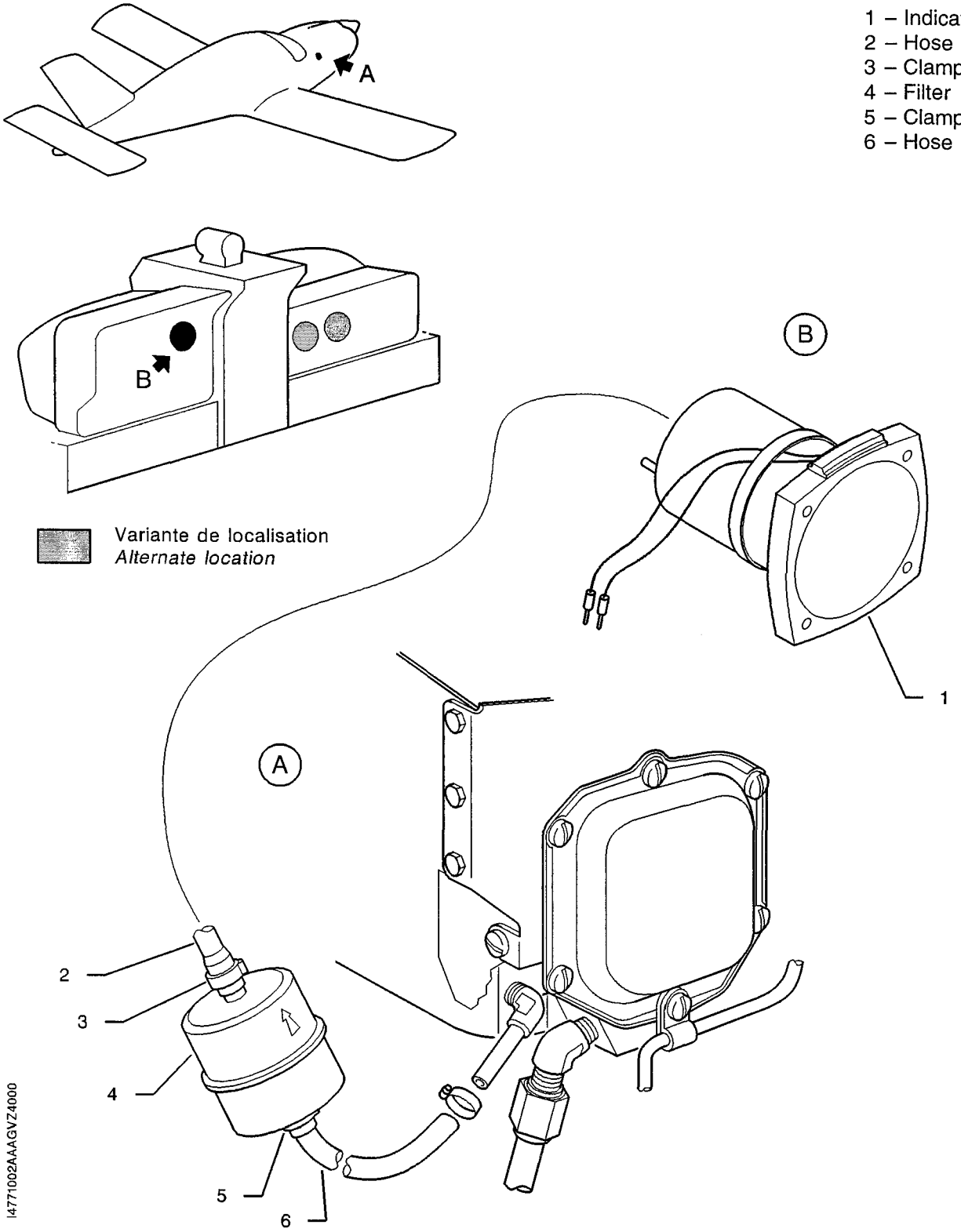
4. INSPECTION / CHECK – MANIFOLD PRESSURE FILTER

A. Tools and consumable materials

None

B. Inspection of the filter

The inspection of the filter is visually carried out. As soon as black oil or fuel stains appear, the filter must be removed and replaced.



1 – Indicator
2 – Hose
3 – Clamp
4 – Filter
5 – Clamp
6 – Hose

Manifold pressure – Removal / Installation
Figure 201

TEMPERATURE

DESCRIPTION AND OPERATION

1. GENERAL

This section deals with the system which gives the indications on the engine temperature.

The main elements are :

- cylinder head temperature and exhaust temperature dual indicator,
- cylinder head temperature probe,
- exhaust temperature probe.

2. LOCATION (Figure 1)

COMPONENT	QTY	AREA	ACCESS DOOR	REFERENCE
Temperature dual indicator	1	250	/	77-20-00
Cylinder head temperature probe	1	100	121 / 131	77-20-00
Exhaust temperature probe	1	100	121 / 131	77-20-00

3. DESCRIPTION

A. Temperature dual indicator

The temperature dual indicator is located on the instrument panel. It receives information from temperature probes and displays data relative to the cylinder head temperature and the exhaust gas temperature.

Aircraft with fixed pitch propeller

B. Cylinder head temperature probe

Located on cylinder head 2, it provides the dual indicator with information.

C. Exhaust temperature probe

Located on cylinder 2 exhaust pipe, it provides the dual indicator with information.

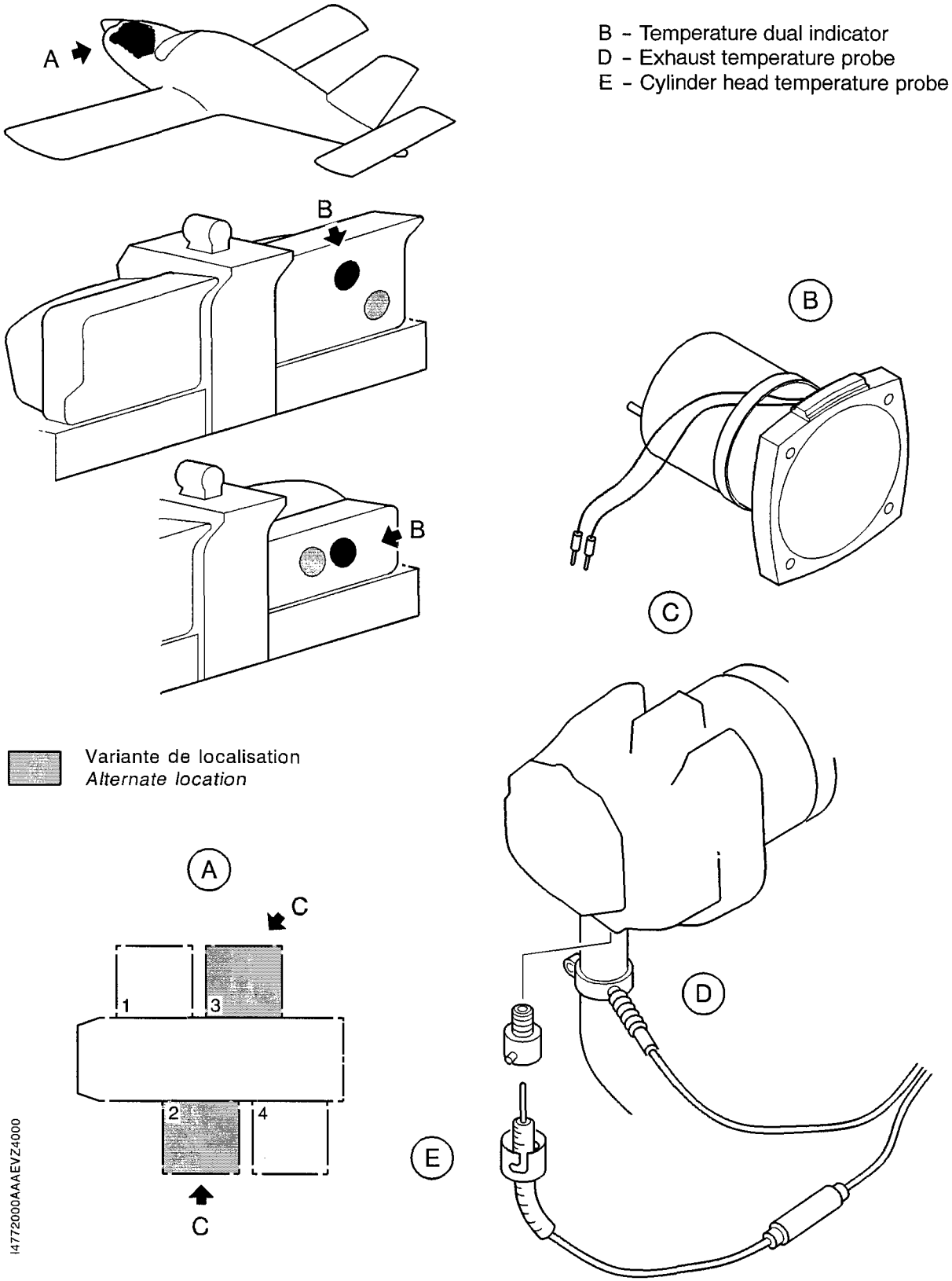
Aircraft with constant speed propeller

B. Cylinder head temperature probe

Located on cylinder head 3, it provides the dual indicator with information.

C. Exhaust temperature probe

Located on cylinder 3 exhaust pipe, it provides the dual indicator with information.



B - Temperature dual indicator
D - Exhaust temperature probe
E - Cylinder head temperature probe

Temperature - Location of components
Figure 1

TEMPERATURE

MAINTENANCE PRACTICES

1. SERVICING - TEMPERATURE

For maintenance operations, refer to “ALCOR Portable EGT Thermometer Operators Manual” and to “ALCOR Portable CHT Thermometer Operators Manual” at the latest revision in force - refer to 00-00-00.

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