74

IGNITION

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IGNITION

DESCRIPTION AND OPERATION

1. GENERAL

The ignition system is made up of the equipment and components used to produce, control and distribute electricity to ignite the air/fuel mixture in the engine cylinders.

The ignition system is made up of the following sub-systems :

- electric generation system - refer to 74-10-00,
- distribution - refer to 74-20-00.

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ELECTRIC GENERATION SYSTEM

DESCRIPTION AND OPERATION

1. GENERAL

The electric generation system is used to produce and distribute the high voltage electrical curent used to ignite the air/fuel mixture in the engine cylinders.

The electric generation system consists of :

- magneto selector,
- magnetos.

2. LOCATION (Figures 1 and 1A)

COMPONENT	QTY	AREA	ACCESS DOOR	REFERENCE
Magneto selector	1	254L	/	74-10-00
Magnetos	2	100	121 / 131	74-10-01

3. DESCRIPTION

A. Magneto selector

The magneto selector is located on the lower part of the L.H. instrument panel. It establishes the magneto contact and controls the starter relay.

B. Magnetos

The magnetos are secured to the engine rear table. They produce and distribute the high voltage current necessary for the ignition of the air/fuel mixture.

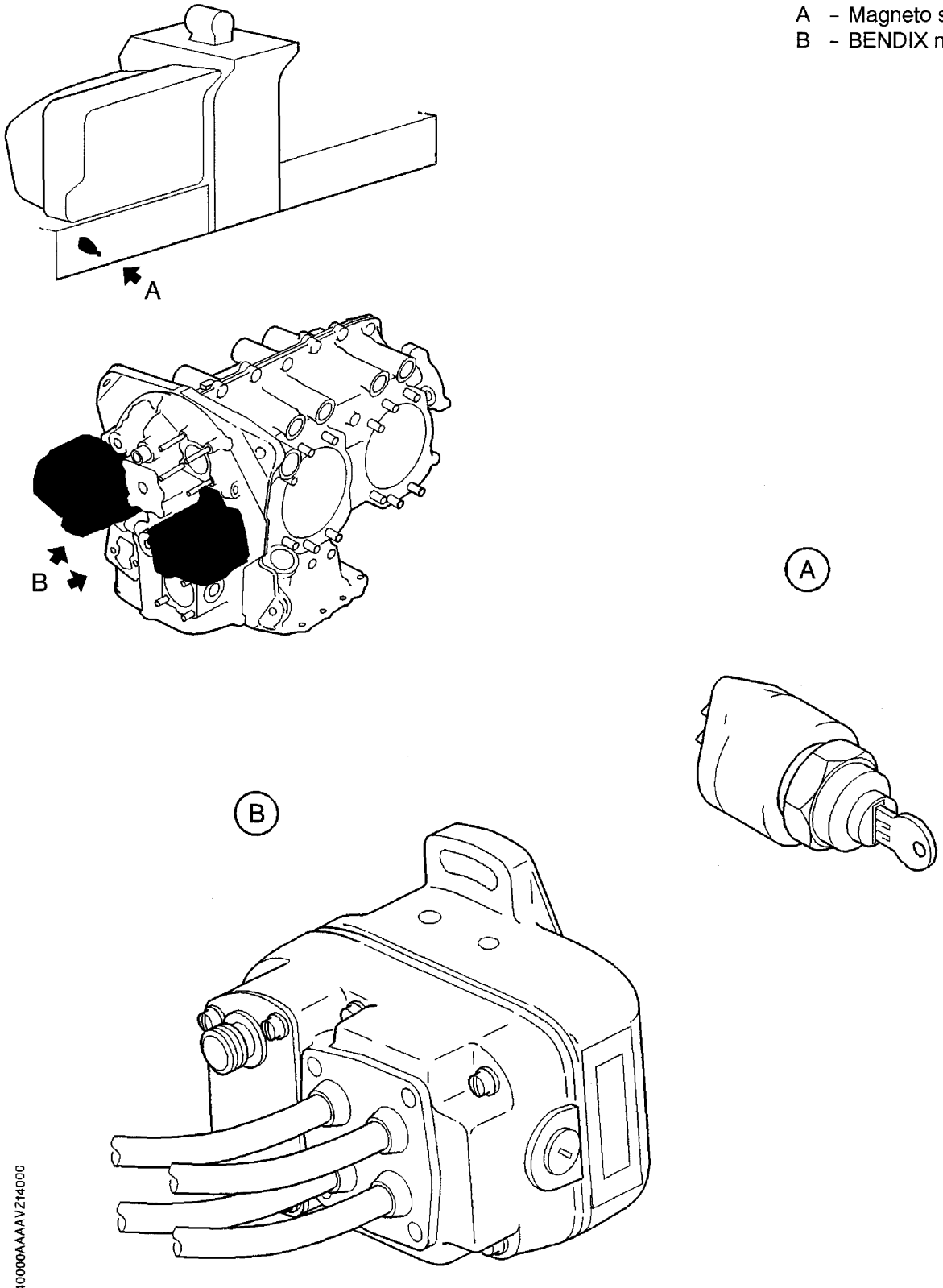
The engine ignition sequence is : 1. 4. 2. 3.

4. OPERATION

The magneto selector is actuated by means of a key that must be turned clockwise in order to ensure the following functions : "OFF" ; "L" magneto : "R" magneto ; "BOTH" magnetos ; "START PUSH".

NOTE : Release the key when engine starts, the selector positions automatically to "BOTH".

A - Magneto selector
B - BENDIX magneto



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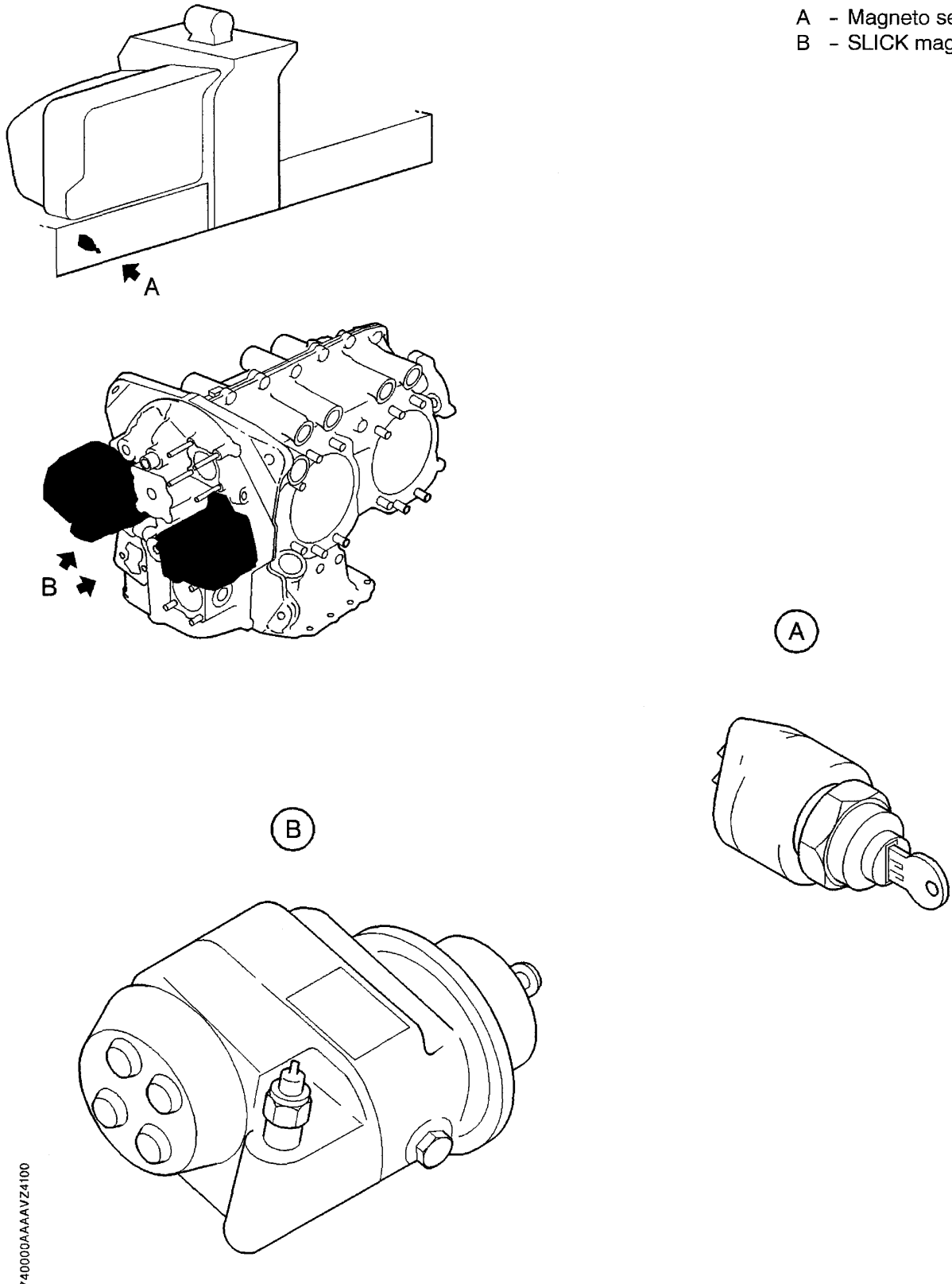
Electric generation system - Identification and location of components
Figure 1

A - Magneto selector
B - SLICK magneto



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Electric generation system - Identification and location of components
Figure 1A

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MAGNETOS

REMOVAL / INSTALLATION

1. REMOVAL OF L.H. AND R.H. MAGNETOS (Figures 401 and 401A)

A. Tools and consumable materials

None

B. Procedure

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 the engine cowlings - refer to 71-10-01.

2) Remove the ignition harnesses - refer to 74-20-01.

BENDIX magneto

3) On each magneto, disconnect magneto end (9) and ground wire (10).

4) Hold L.H. magneto (8), remove nuts (5), lockwashers (6) and washers (7). Discard lockwashers (6).

5) Clear L.H. magneto (8) rearwards and remove it.

6) Remove gaskets (1) and adapter (12). Discard gaskets (1).

7) Hold R.H. magneto (2), remove nuts (5), lockwashers (6) and washers (7). Discard lockwashers (6).

8) Clear R.H. magneto (2) rearwards and remove it.

9) Remove and discard gasket (1).

SLICK magneto

3) On each magneto, remove nut (16) and lockwasher (17), then disconnect cable (21). Remove screw (19) and washer (18), then disconnect ground wire (10).

4) Hold L.H. magneto (8), remove nuts (5), lockwashers (6) and clamps (14). Discard lockwashers (6).

5) Clear L.H. magneto (8) rearwards and remove it.

6) Remove seal (13), adapter (12) and gasket (1). Discard gasket (1) and seal (13).

7) Hold R.H. magneto (2), remove nuts (5), lockwashers (6) and clamps (14). Discard lockwashers (6).

8) Clear R.H. magneto (2) rearwards and remove it.

9) Remove and discard seal (13).

2. INSTALLATION OF L.H. AND R.H. MAGNETOS (Figures 401 and 401A)

A. Tools and consumable materials

- Red paint
- Varnish (TB 07-901)

- Timing pin SLICK T118
- Timing unit Z00.N6007107243

B. Preliminary steps

1) Record the spark advance value indicated on the engine data plate.
2) Set cylinder No. 1 to full-advance firing position.
3) Align the spark advance mark located on the ring gear front face with the mark located on the starter front face.

   NOTE : The engine is ready for magneto installation. Do not rotate the propeller.

4) Time the L.H. and R.H. magnetos :

   BENDIX magneto

   a) Remove plug (3).

   b) Rotate the drive shaft in the normal magneto rotation direction until the painted tooth of the distributor gear is centered in the slot - see Detail A.

   SLICK magneto

   a) Mark and remove cover (15).

   b) Locate the "L" slot on distributor block (20) and slightly insert the timing pin.

   CAUTION : DO NOT ROTATE THE DRIVE SHAFT WHEN THE TIMING PIN IS INSERTED IN THE DISTRIBUTOR BLOCK.

   c) Slowly rotate the drive shaft in the normal magneto rotation direction while pushing on the timing pin until it bottoms in the "L" slot. The drive shaft is immobilized.

C. Procedure

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.

CAUTION : IT IS FORBIDDEN TO INSTALL DIFFERENT TYPES OF MAGNETOS TOGETHER.

1) Make sure cotter pin (11) is installed.
2) Lubricate the new seals and the new gaskets with engine oil.

BENDIX magneto

3) Position new gaskets (1) and adapter (12).

CAUTION : DO NOT ROTATE THE PROPELLER.

CAUTION : KEEP L.H. MAGNETO (8) IN THE TIMING POSITION.

CAUTION : POSITION L.H. MAGNETO (8) WITH ITS DATA PLATE FACING OUTWARDS.

4) Position and secure L.H. magneto (8) with washers (7), new lockwashers (6) and nuts (5). Hand-tighten nuts (5).

5) Make sure L.H. magneto (8) is still timed.

6) Connect the L.H. connector of the timing unit to switch terminal (4) of L.H. magneto (8), then connect the ground wire of the timing unit to the engine ground. Switch on the timing unit.

7) Slowly rotate L.H. magneto (8) to the left or to the right until the indicator light of the timing unit comes on, then slowly rotate it in the opposite direction until the indicator light goes off. Gradually rotate L.H. magneto (8) backwards until the indicator light comes on. Tighten nuts (5).

CAUTION : DO NOT ROTATE THE PROPELLER.

CAUTION : KEEP R.H. MAGNETO (2) IN THE TIMING POSITION.

CAUTION : POSITION R.H. MAGNETO (2) WITH ITS DATA PLATE FACING OUTWARDS.

8) Position new gasket (1) and R.H. magneto (2). Secure R.H. magneto (2) with washers (7), new lockwashers (6) and nuts (5). Hand-tighten nuts (5).

9) Make sure R.H. magneto (2) is still timed.

10) Connect the R.H. connector of the timing unit to switch terminal (4) of R.H. magneto (2).

11) Slowly rotate R.H. magneto (2) to the left or to the right until the indicator light of the timing unit comes on, then slowly rotate it in the opposite direction until the indicator light goes off. Gradually rotate R.H. magneto (2) backwards until the indicator light comes on. Tighten nuts (5).

12) Rotate the propeller in the normal rotation direction and set cylinder No. 1 to full-advance firing position.

13) Rotate the propeller in the normal rotation direction until the spark advance mark located on the ring gear front face aligns with the mark located on the starter front face. Both indicator lights of the timing unit must come on.

14) Switch off and disconnect the timing unit.

15) On each magneto :

- install plug (3),
- connect magneto end (9) and ground wire (10).

SLICK magneto

3) Position new gasket (1), adapter (12) and new seal (13).

CAUTION : DO NOT ROTATE THE PROPELLER.

CAUTION : POSITION L.H. MAGNETO (8) WITH ITS DATA PLATE FACING UPWARDS.

4) Position and secure L.H. magneto (8) with clamps (14), new lockwashers (6) and nuts (5). Hand-tighten nuts (5).

5) Connect the L.H. connector of the timing unit to switch terminal (4) of L.H. magneto (8), then connect the ground wire of the timing unit to the engine ground. Switch on the timing unit. The indicator light must come on.

6) Tighten nuts (5) and remove the timing pin.

CAUTION : DO NOT ROTATE THE PROPELLER.

CAUTION : POSITION R.H. MAGNETO (2) WITH ITS DATA PLATE FACING DOWNWARDS.

7) Position new seal (13) and R.H. magneto (2). Secure R.H. magneto (2) with clamps (14), new lockwashers (6) and nuts (5). Hand-tighten nuts (5).

8) Connect the R.H. connector of the timing unit to switch terminal (4) of R.H. magneto (2). The indicator light must come on.

9) Tighten nuts (5) and remove the timing pin.

CAUTION : MAKE SURE THE TIMING PINS HAVE BEEN REMOVED.

10) Rotate the propeller in the normal rotation direction and set cylinder No. 1 to full-advance firing position.

11) Rotate the propeller in the normal rotation direction until the spark advance mark located on the ring gear front face aligns with the mark located on the starter front face. Both indicator lights of the timing unit must come on and the timing pin must easily fit into the "L" slot of both magnetos.

12) Switch off and disconnect the timing unit.

CAUTION : DO NOT FORGET TO REMOVE THE TIMING PIN.

13) On each magneto :

- remove the timing pin and install cover (15),
- connect cable (21) with new lockwasher (17) and nut (16),
- connect ground wire (10) with washer (18) and screw (19).

All

16) Coat electrical connections with varnish (TB 07-901).

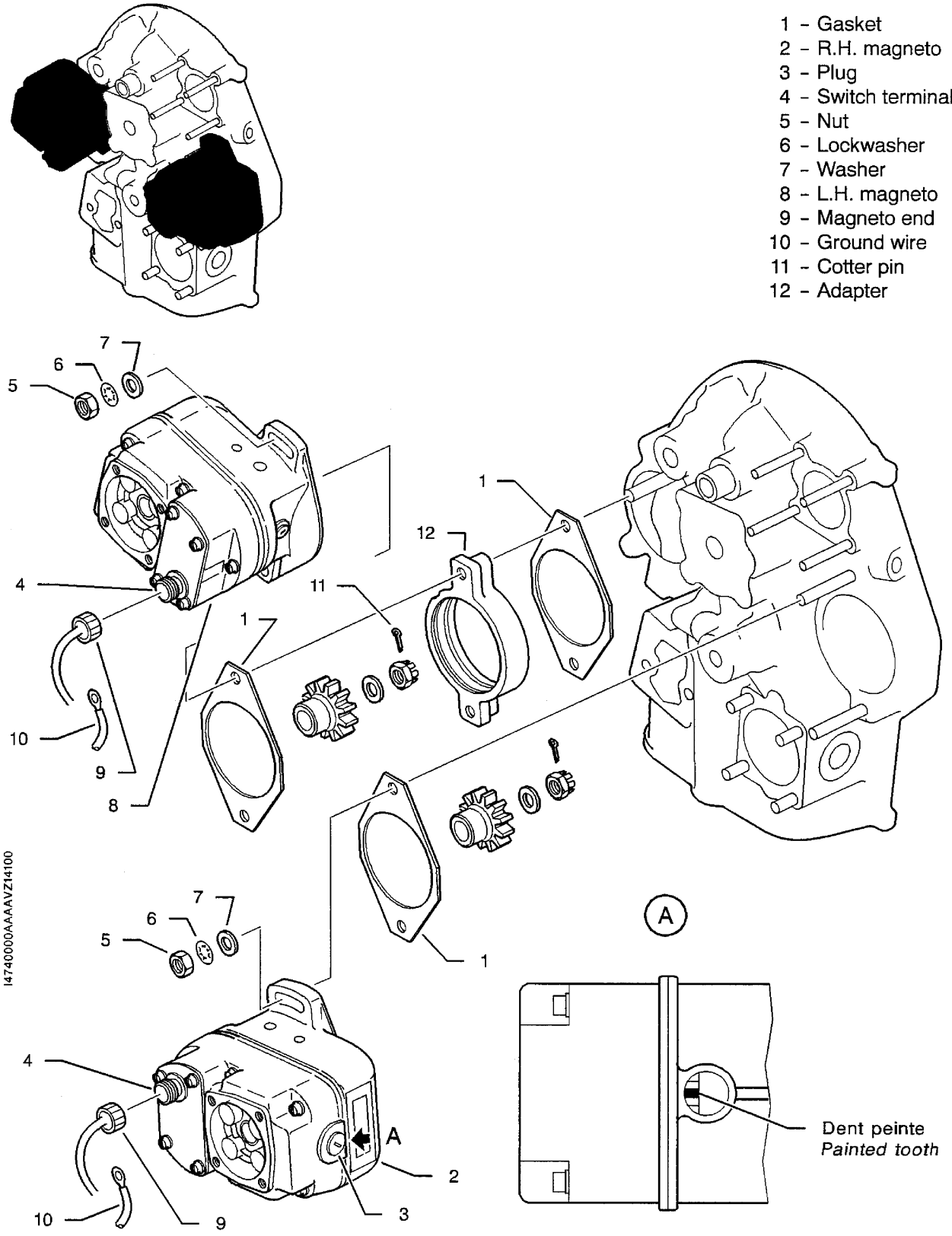
17) Mark nuts (5) with a red paint line.

18) Install the ignition harnesses - refer to 74-20-01.

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

20) Install the engine cowlings - refer to 71-10-01.

21) Perform a test run-up - refer to 05-30-02.



BENDIX magnetos - Removal / Installation
Figure 401

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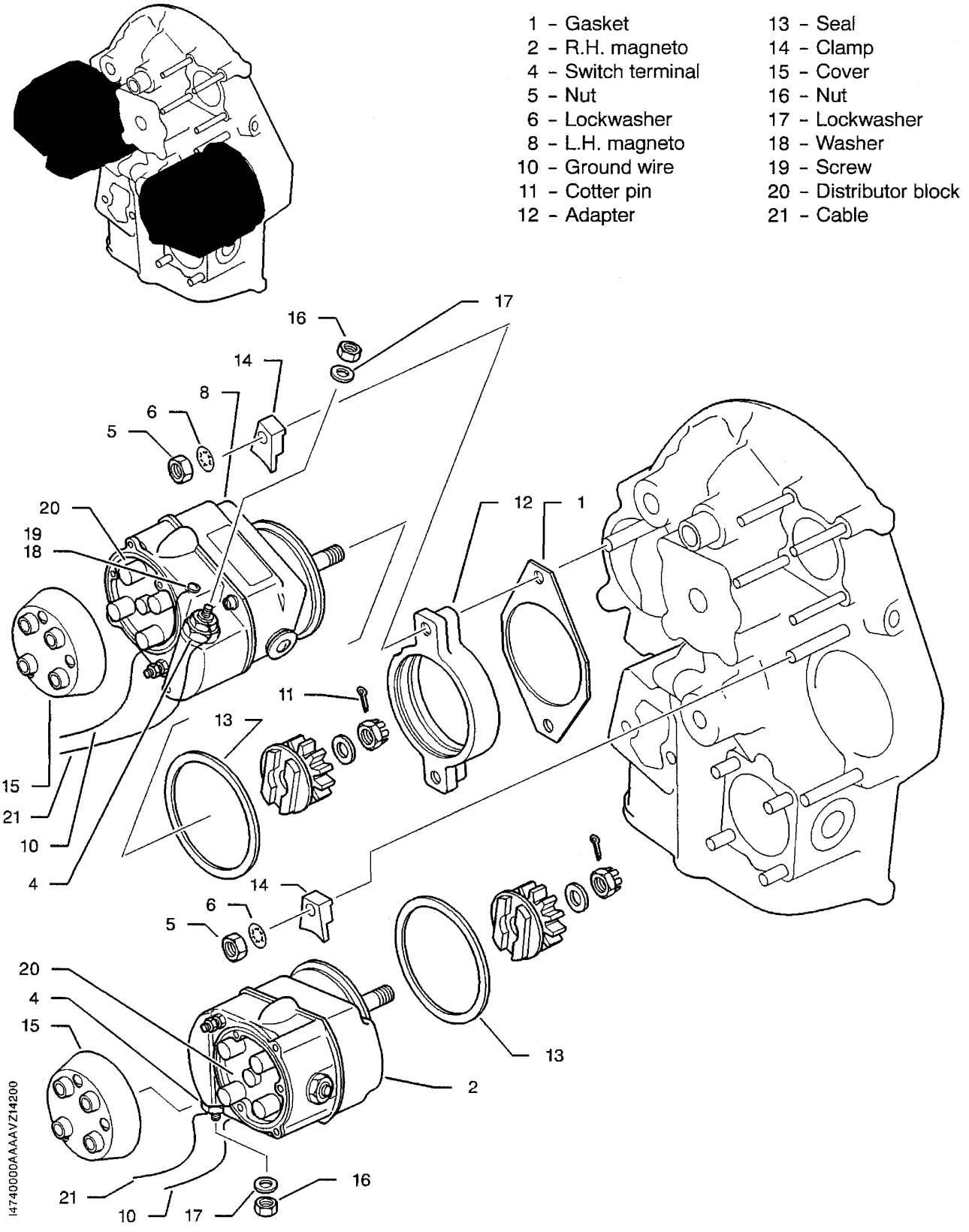

SLICK magnetos - Removal / Installation
Figure 401A

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DISTRIBUTION

DESCRIPTION AND OPERATION

1. GENERAL (Figure 1)

The distribution is the part of the system used to carry high voltage current from the electrical power source to the spark plugs to ignite the air/fuel mixture.

The distribution consists of :

- ignition harnesses,
- spark plugs.

2. LOCATION (Figure 2)

COMPONENT	QTY	AREA	ACCESS DOOR	REFERENCE
Ignition harness	2	100	121 / 131	74-20-01
Spark plug	8	100	121 / 131	74-20-02

3. DESCRIPTION

A. Ignition harness

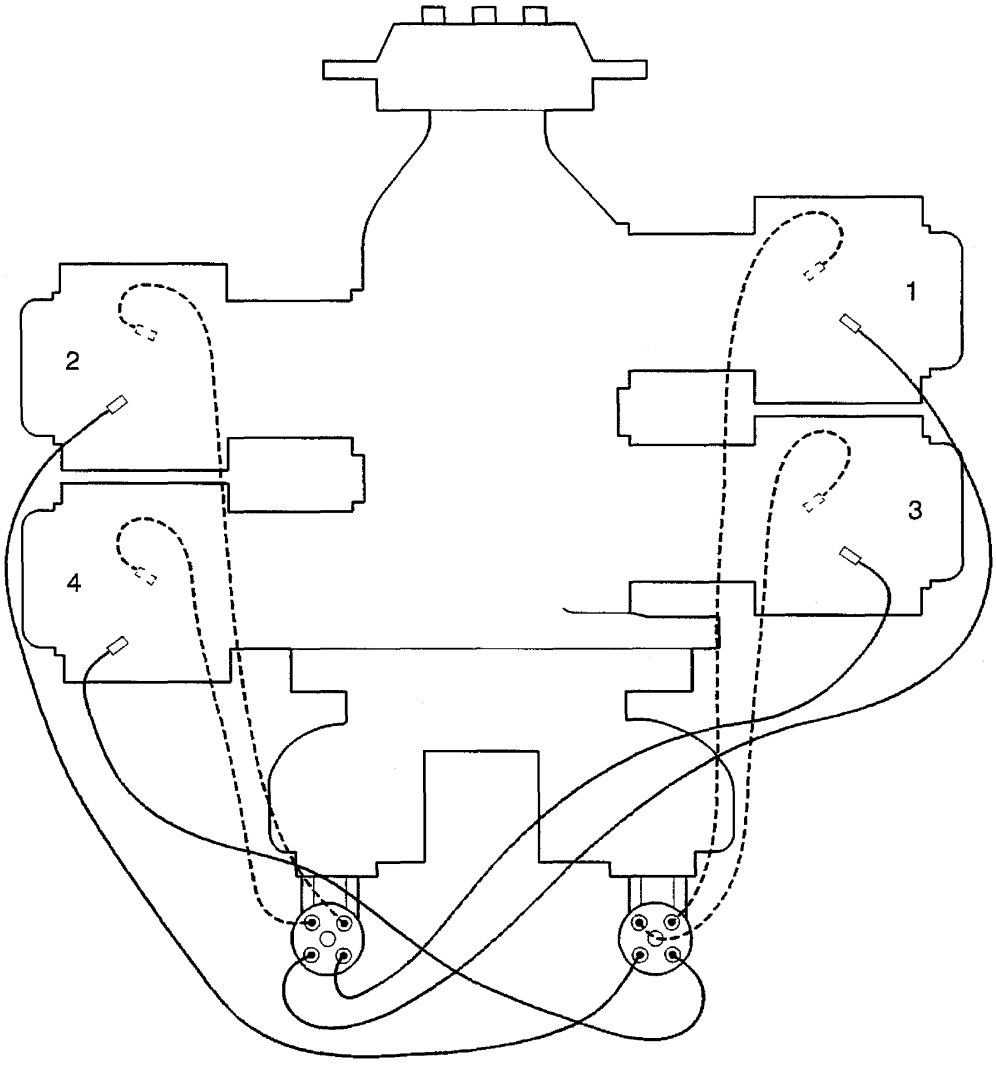
The ignition harness is used to carry to the spark plugs the high voltage current produced and distributed by the magneto.

The shielded cables connect the magneto distributor to the spark plugs. They run around the engine and have threaded ends to which insulating porcelains, fitted with a small spring, are secured. This spring is used for the contact between the wiring and the spark plug.

B. Spark plug

The spark plugs are secured to the cylinder heads. There are 2 spark plugs per cylinder, one at the top and one at the bottom. Each spark plug is supplied by a magneto.

The spark plug generates a spark, between 2 electrodes, from the high voltage current.



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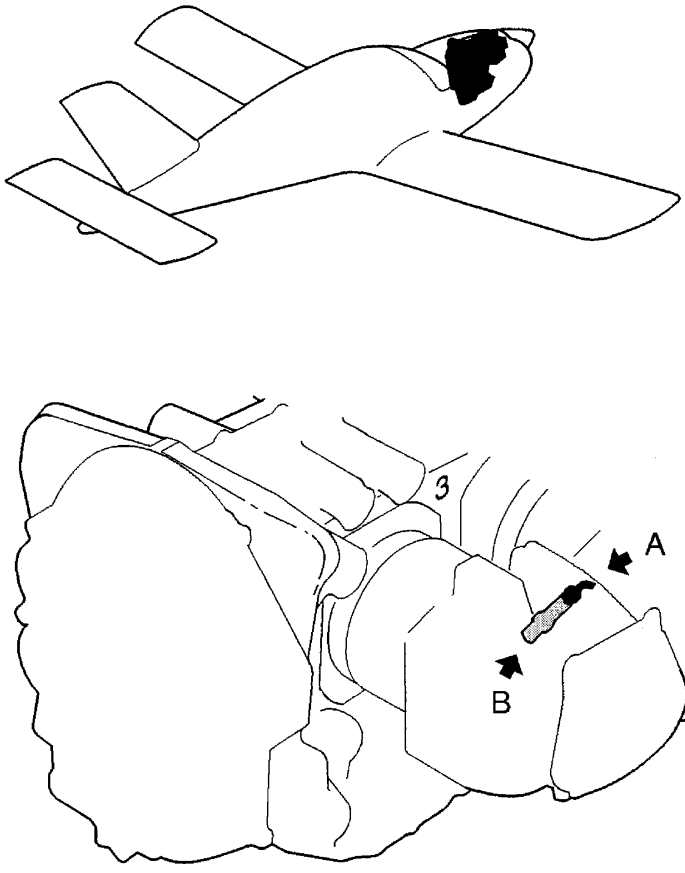
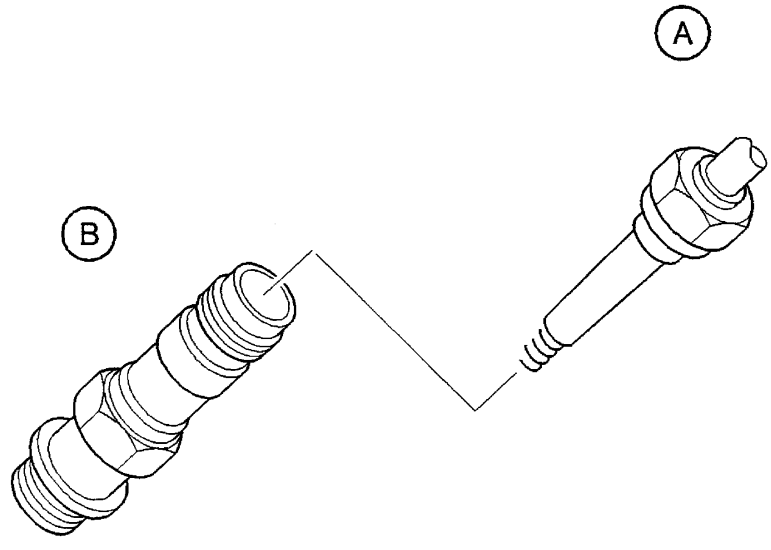
Distribution - Electrical schematic
Figure 1

A - Ignition harness end
B - Spark plug





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Distribution - Identification and location of components
Figure 2

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IGNITION HARNESS

REMOVAL / INSTALLATION

NOTE : This procedure is applicable to L.H. and R.H. installations. Information specific to R.H. installation are given in square brackets.

1. REMOVAL OF IGNITION HARNESS (Figure 401)

A. Tools and consumable materials

- Vinyl tube, inner diameter 0.31 in (8 mm)

B. Procedure

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 the engine cowlings - refer to 71-10-01.
2) Mark the ignition harness routing.
3) Cut and discard the high temperature tie-wraps.
4) Remove the engine bulkhead grommets.
5) Disconnect harness ends (2).
6) Protect the insulating part of harness ends (2) with a vinyl tube.

CAUTION : DO NOT PEEL THE HARNESS PROTECTIVE SLEEVE WHEN PASSING THE IGNITION HARNESS THROUGH THE ENGINE BULKHEADS.

7) Clear the ignition harness.
8) Mark and remove magneto cover (3).

2. INSTALLATION OF IGNITION HARNESS (Figure 401)

A. Tools and consumable materials

- High temperature tie-wraps
- Cleaning agent (TB 11-003)
- Clean, lintfree cloth

B. Procedure

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.

CAUTION : DO NOT TOUCH THE INSULATING PART OF THE HARNESS ENDS ONCE CLEANING HAS BEEN PERFORMED.

1) Clean harness ends (2) with a clean, lintfree cloth moistened with cleaning agent (TB 11-003).

2) Install magneto cover (3).

CAUTION : DO NOT PEEL THE HARNESS PROTECTIVE SLEEVE WHEN PASSING THE IGNITION HARNESS THROUGH THE ENGINE BULKHEADS.

3) Position the ignition harness. A digit, followed by a letter, is engraved on the nut of harness end (2) - see Detail C. Match the digit with engine marking (1). The letter determines the position of the harness with respect to the cylinder :

   - T for the top spark plug,
   - B for the bottom spark plug.

4) Check the ignition harness for correct routing.

5) Remove the protection and connect harness ends (2). Torque - refer to 20-00-01.

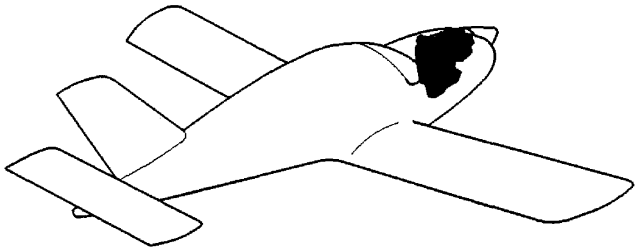
6) Install the engine bulkhead grommets.

7) Install new high temperature tie-wraps.

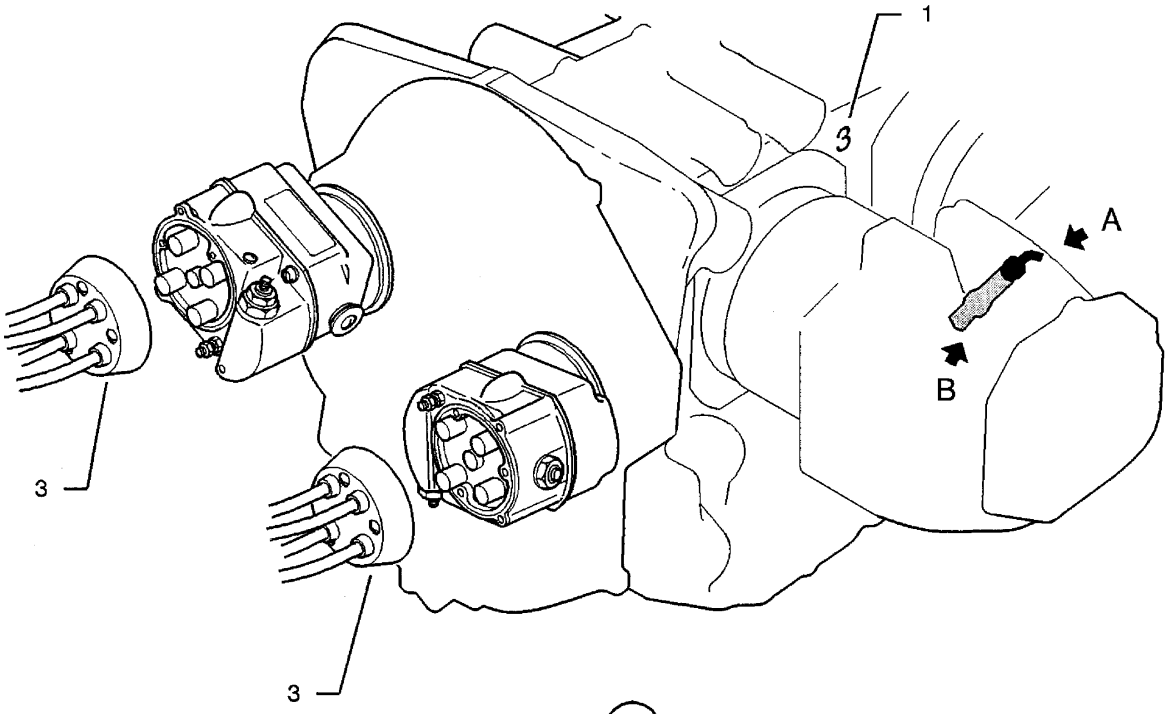
8) Make sure all the tools and materials are removed and the work area is clean and free from debris.

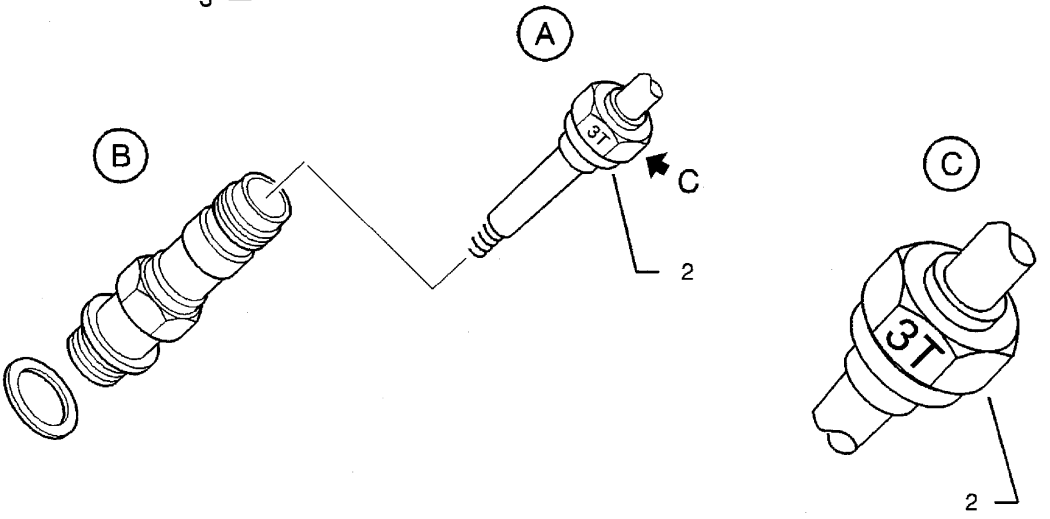
9) Install the engine cowlings - refer to 71-10-01.

10) Perform a test run-up - refer to 05-30-02.



1 - Engine marking
2 - Harness end
3 - Cover





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Ignition harness - Removal / Installation
Figure 401

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SPARK PLUG

SERVICING

1. CLEANING OF A SPARK PLUG

A. Tools and consumable materials

- Vibration cleaning equipment Champion 2600A or equivalent
- Dry air blast cleaning equipment Champion CT-475AV or equivalent
- Cleaning agent (TB 11-003)

B. Procedure

1) Remove the spark plug - refer to Page 401.
2) Inspect the spark plug - refer to Page 601.

CAUTION : DO NOT GRIND OR SCRUB WITH A WIRE BRUSH THE SPARK PLUG ELECTRODES.

3) Remove hard deposits from the spark plug electrodes using the vibration cleaning equipment.

CAUTION : CLEANING USING THE DRY AIR BLAST CLEANING EQUIPMENT MUST NOT EXCEED 5 SECONDS.

4) Perform the final cleaning of the electrodes using the dry air blast cleaning equipment.

CAUTION : CLEANING USING THE DRY AIR BLAST CLEANING EQUIPMENT MUST NOT EXCEED 5 SECONDS.

5) Clean the spark plug barrel using the dry air blast cleaning equipment or cleaning agent (TB 11-003).
6) Clean the spark plug threads with cleaning agent (TB 11-003).
7) Install the spark plug - refer to Page 401.

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SPARK PLUG

REMOVAL / INSTALLATION

1. REMOVAL OF A SPARK PLUG (Figure 401)

A. Tools and consumable materials

- Blanking caps
- Hexagon spark plug wrench

B. Procedure

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 the engine cowlings - refer to 71-10-01.
2) Disconnect the ignition harness - refer to 74-20-01.
3) Remove spark plug (1) using a hexagon spark plug wrench.

   NOTE : When removing several spark plugs, mark their positions (top spark plug, bottom spark plug and cylinder number).

4) Discard gasket (2).
5) Blank off the cylinder.

2. INSTALLATION OF A SPARK PLUG (Figure 401)

A. Tools and consumable materials

- Hexagon spark plug wrench
- Torque wrench 0 to 885 lbf.in (0 to 100 N.m)
- Grease (TB 04-003)
- Fine brush
- Setting tool Champion 2500A or CT-415 AV or equivalent

B. Procedure

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) Inspect the spark plug - refer to Page 601.
2) Adjust the gap between the electrodes of spark plug (1) using the setting tool :

   0.016 in (0.41 mm) < Gap < 0.022 in (0.53 mm).

3) Install a new gasket (2).

CAUTION : DO NOT APPLY GREASE ON THE SPARK PLUG ELECTRODES.

4) Using a fine brush, moderately coat thread (3) with grease (TB 04-003).

5) Remove the blanking cap.

6) Install spark plug (1). Torque - refer to 20-00-01.

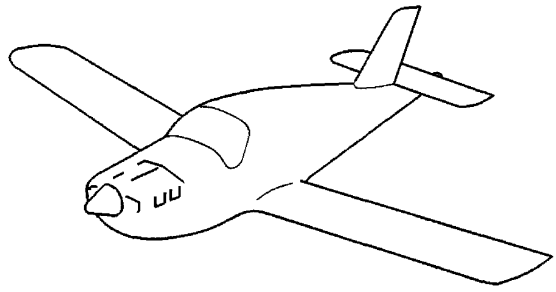
NOTE : When installing both spark plugs of a cylinder, permute the spark plugs.

7) Connect the ignition harness - refer to 74-20-01.

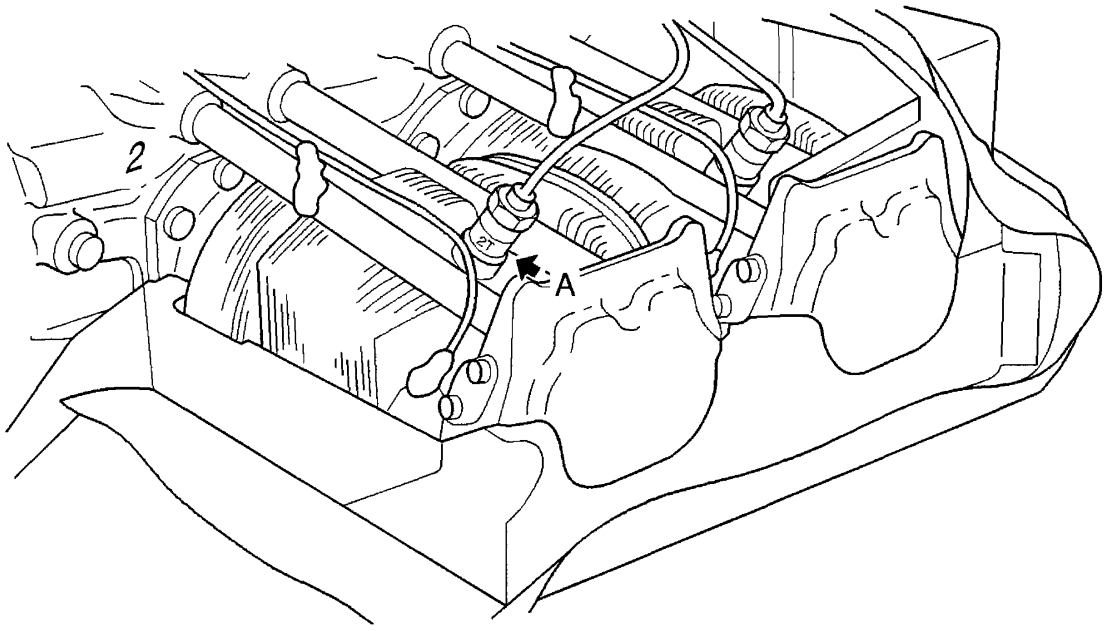
8) Make sure all the tools and materials are removed and the work area is clean and free from debris.

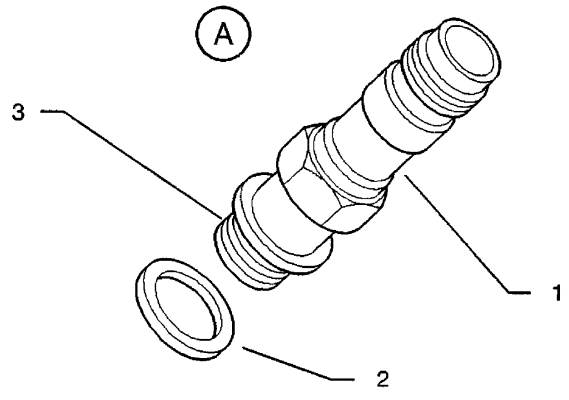
9) Install the engine cowlings - refer to 71-10-01.

10) Perform a test run-up - refer to 05-30-02.



1 - Spark plug
2 - Gasket
3 - Thread





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Spark plug - Removal / Installation
Figure 401

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SPARK PLUG

INSPECTION / CHECK

1. INSPECTION OF A SPARK PLUG

A. Tools and consumable materials

None

B. Procedure

1) Remove the spark plug - refer to Page 401.
2) Perform a detailed inspection of :
   - outer body,
   - threads,
   - inner ceramic,
   - insulator,
   - electrodes (erosion).
3) Depending on condition, replace or clean the spark plug - refer to Page 301.
4) Install the spark plug - refer to Page 401.

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