

37

VACUUM

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VACUUM

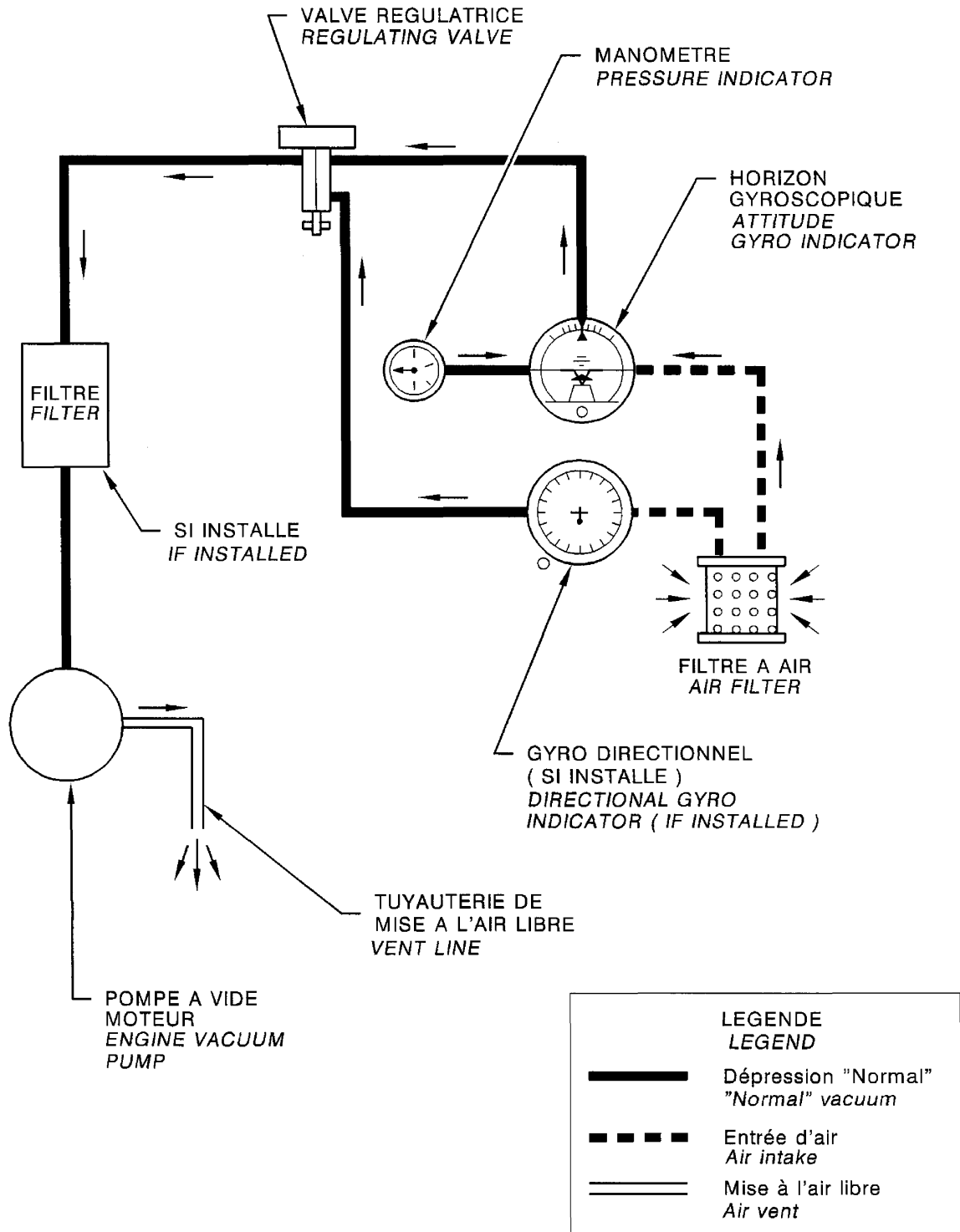
DESCRIPTION AND OPERATION

1. GENERAL (Figure 1)

The vacuum system is used to create the suction necessary for the operation of the attitude indicator and of the directional gyro indicator.

The system consists of :

- Distribution (normal) - refer to 37-11-00,
- Indicating - refer to 37-20-00.



14370000AAAAOVZ4001

Vacuum - Schematic
Figure 1

**NORMAL DISTRIBUTION
DESCRIPTION AND OPERATION**

1. GENERAL

The aircraft can be fitted with a vacuum system providing the suction necessary to operate the attitude indicator and the directional gyro indicator.

The vacuum system consists of :

- a vacuum pump,
- a regulating valve (or vacuum relief valve),
- an air filter,
- an additional air filter (if installed).

2. LOCATION (Figures 1 and 1A)

COMPONENT	QTY	AREA	ACCESS DOOR	REFERENCE
Vacuum pump	1	100	121	37-11-01
Regulating valve	1	230	211L	37-11-00
Air filter	1	230	211L	37-11-00
Additional air filter (if installed)	1	120	121	37-11-01

3. DESCRIPTION

A. Vacuum pump

The vacuum pump is driven by the engine and provides the energy necessary for operation of the instruments supplied.

B. Regulating valve

The diaphragm type regulating valve incorporates a screw for adjustment. Regulation is obtained by a spring which controls the diaphragm. The valve is equipped with a foam filter and is located behind the firewall.

Pre-MOD. 151

If the gyros alarm option is installed, the regulating valve can be equipped with an S67 pressure switch for indicating.

Post-MOD. 151

The regulating valve is equipped with an S67 pressure switch for indicating.

C. Air filter

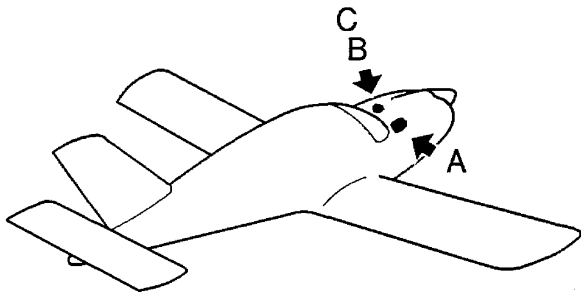
The paper filter is installed between the firewall and the instrument panel.

D. Additional air filter (if installed)

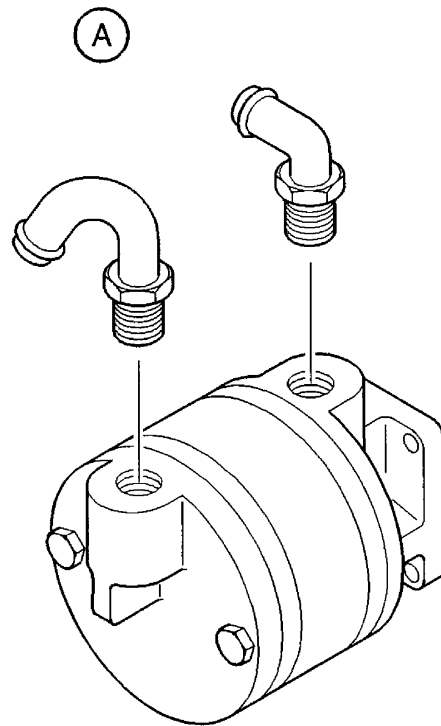
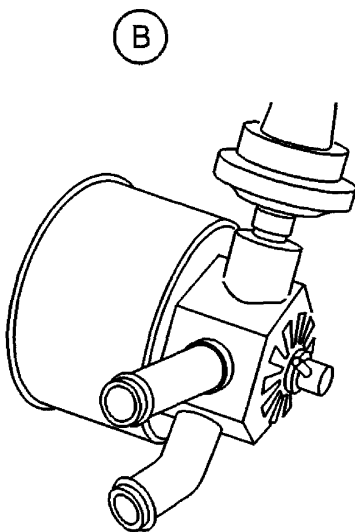
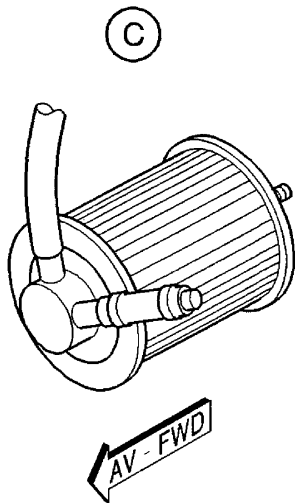
When a SIGMATEK, CHAMPION or AERO ACCESSORIES pump is installed, a filter is installed between the pump and the regulating valve.

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- A - Vacuum pump
- B - Regulating valve
- C - Air filter

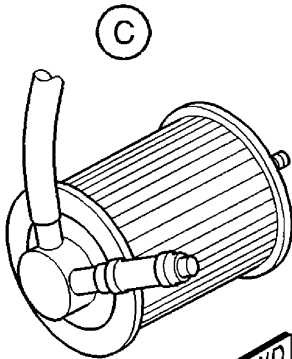
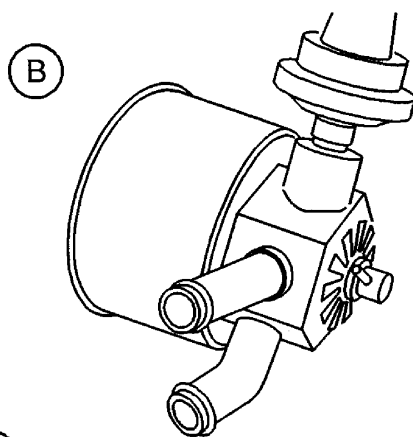


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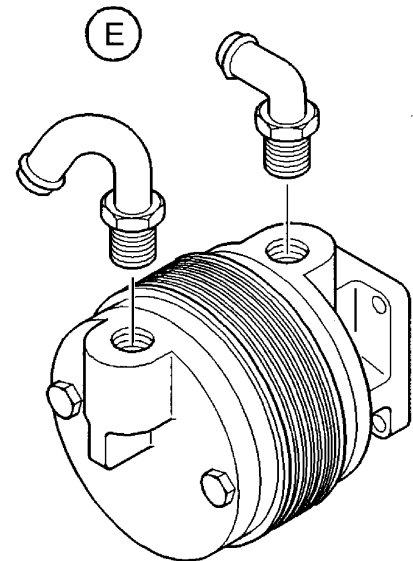
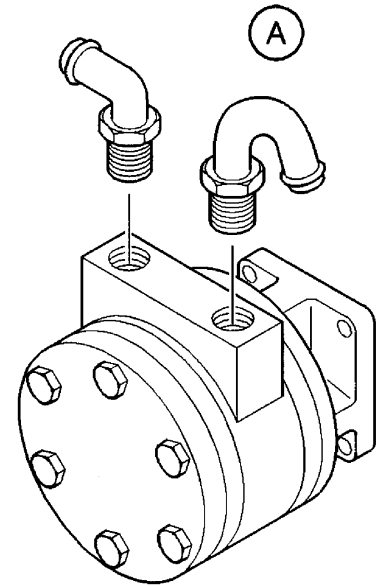
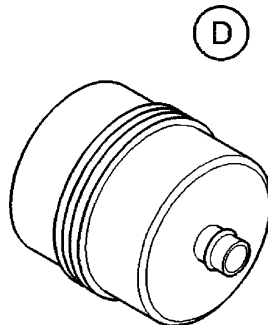
Normal distribution - Identification and location of components
Figure 1 - AIRBORNE pump



- A - SIGMATEK vacuum pump
- B - Regulating valve
- C - Air filter
- D - Air filter
- E - CHAMPION or AERO ACCESSORIES vacuum pump



AV - FWD



1437100AAAAYZ4101

Normal distribution - Identification and location of components
Figure 1A - SIGMATEK, CHAMPION or AERO ACCESSORIES pump

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**NORMAL DISTRIBUTION
REMOVAL / INSTALLATION**

1. REMOVAL OF THE REGULATING VALVE (Figure 401)

A. Tools and consumable materials

- Blanking caps and plugs

B. Procedure

- 1) Remove engine cowling 121 - refer to 71-10-01.
- 2) If installed, remove inspection door 211L. Otherwise, remove inspection door 212L - refer to 06-30-00.
- 3) Loosen clamp (2) and disconnect hose (1). Blank off.
- 4) Loosen clamps (6) and disconnect hoses (5). Blank off.
- 5) Mark the wires and disconnect pressure switch (8) if installed.
- 6) Remove nut (3).
- 7) Remove regulating valve (4) equipped with shim (9).
- 8) If necessary, remove and discard regulating valve filter (7).

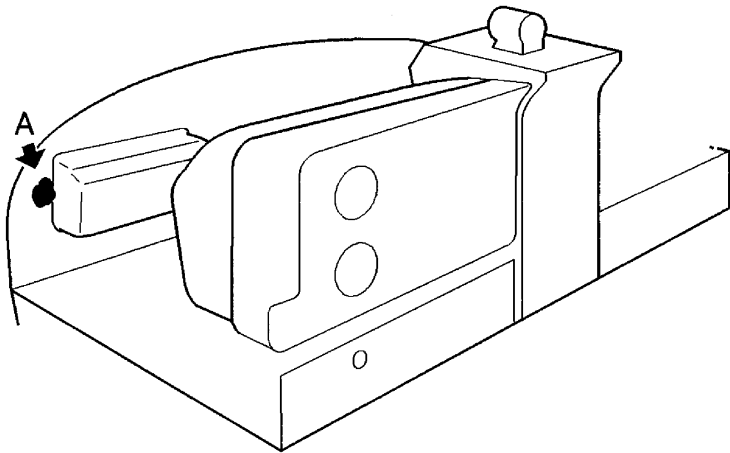
2. INSTALLATION OF THE REGULATING VALVE (Figure 401)

A. Tools and consumable materials

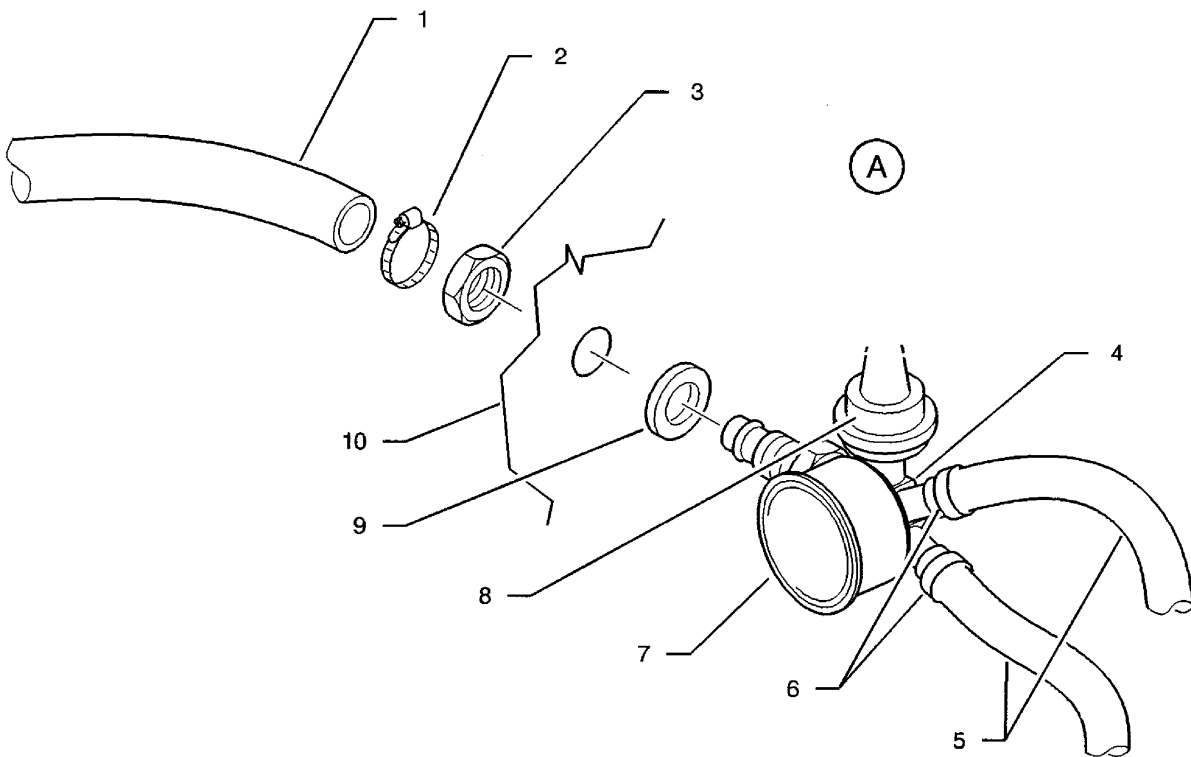
- Varnish (TB 07-906)

B. Procedure

- 1) Remove the blanking caps and plugs.
- 2) If removed, install a new filter (7) on regulating valve (4).
- 3) Using nut (3), secure regulating valve (4) equipped with shim (9) to firewall (10).
- 4) Connect hoses (5). Moderately tighten clamps (6).
- 5) If installed, connect pressure switch (8) as marked during removal. Lock with varnish (TB 07-906).
- 6) Connect hose (1). Moderately tighten clamp (2).
- 7) Make sure all the tools and materials are removed and the work area is clean and free from debris.
- 8) Install inspection door 211L (if installed) or 212L - refer to 06-30-00.
- 9) Install engine cowling 121 - refer to 71-10-01.
- 10) Test the normal distribution system - refer to Page 501.



- 1 - Hose
- 2 - Clamp
- 3 - Nut
- 4 - Regulating valve
- 5 - Hose
- 6 - Clamp
- 7 - Filter
- 8 - Pressure switch
- 9 - Shim
- 10 - Firewall



Regulating valve - Removal / Installation
Figure 401

I4371100AAA VZ14000

NORMAL DISTRIBUTION

ADJUSTMENT / TEST

1. ADJUSTMENT OF THE REGULATING VALVE (Figure 501)

A. Tools and consumable materials

None

B. Procedure

- 1) If installed, remove inspection door 211L - refer to 06-30-00. Otherwise, tilt the L.H. instrument panel.

NOTE : If inspection door 211L is not installed, the following operations are to be performed from the cockpit.

- 2) Straighten locking tabs (4).
- 3) Start the engine - refer to 05-30-01.
- 4) Display 2000 rpm.
- 5) Adjust flow cock (3) until pressure indicator (5) reads 5 ± 0.1 in.Hg.
- 6) Shutdown the engine - refer to 05-30-01.
- 7) Bend locking tabs (4) of flow cock (3).
- 8) Make sure all the tools and materials are removed and the work area is clean and free from debris.
- 9) If installed, install inspection door 211L - refer to 06-30-00. Otherwise, lock the L.H. instrument panel.

2. TEST OF THE NORMAL DISTRIBUTION SYSTEM (Figure 502)

A. Tools and consumable materials

None

B. Procedure

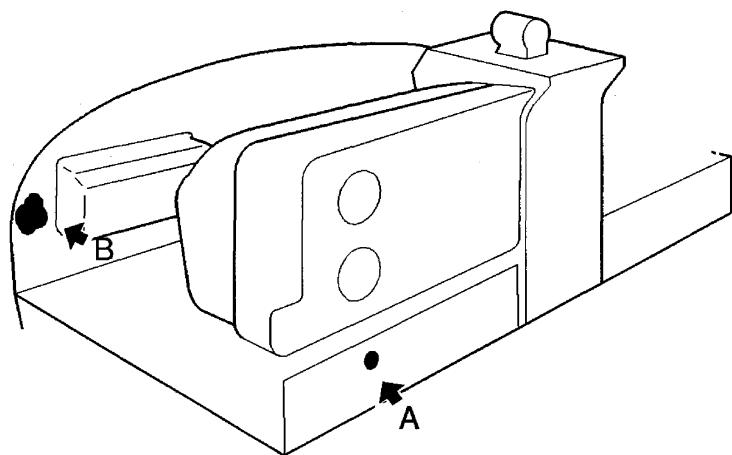
- 1) Close main switch-breaker. "GYRO SUCT" red warning light (1) comes on.
- 2) If "GYRO SUCT" red warning light (1) remains off, press "TEST" button (2), then repair the wiring or replace the bulb, as applicable.
- 3) Start the engine - refer to 05-30-01.
- 4) Display 2000 rpm.
- 5) Check that the pointer of pressure indicator (3) remains in the green range between 4.4 and 5.2 in.Hg.
- 6) Shutdown the engine - refer to 05-30-01.
- 7) If the pointer is not in the green range, perform the following operations and check the system for correct operation after each step :
 - a) Adjust the regulating valve - refer to Paragraph 1.,
 - b) If the values are still not obtained, check the entire system - refer to Page 601,
 - c) Check the instruments, replace if necessary.
- 8) Open main switch-breaker.

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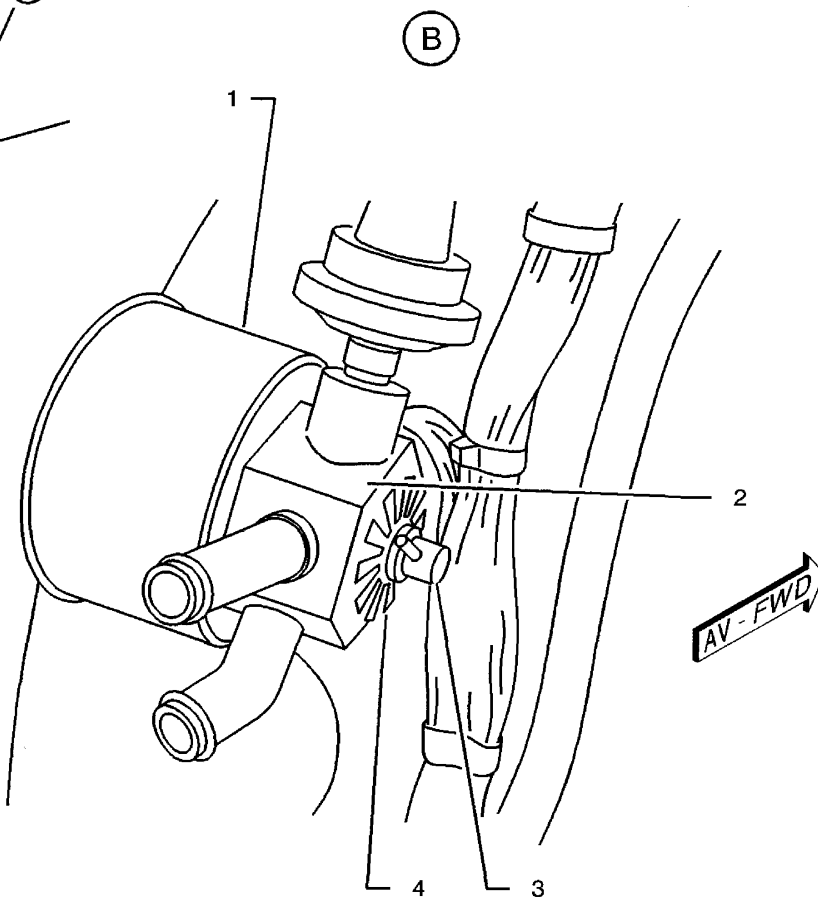
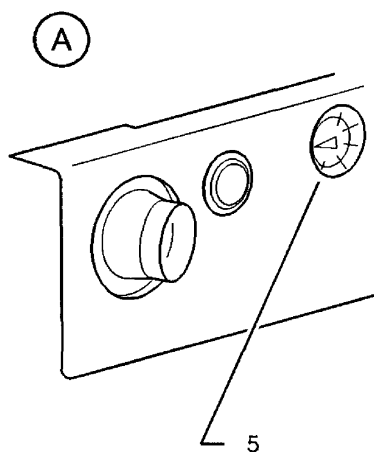
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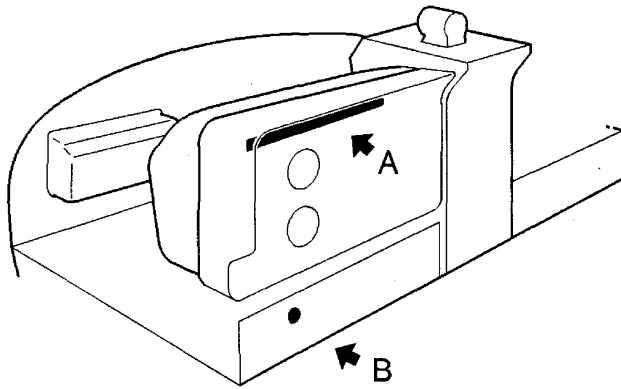


- 1 - Filter
- 2 - Regulating valve
- 3 - Flow cock
- 4 - Locking tab
- 5 - Pressure indicator

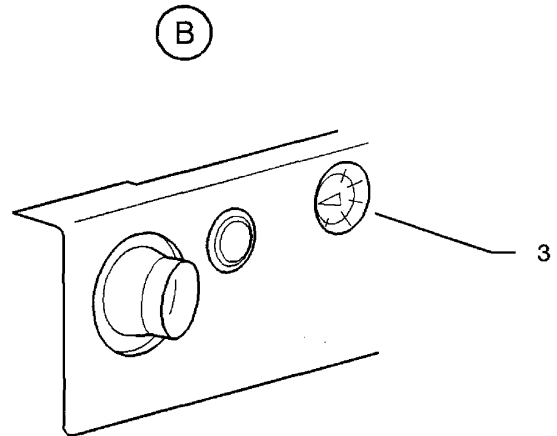
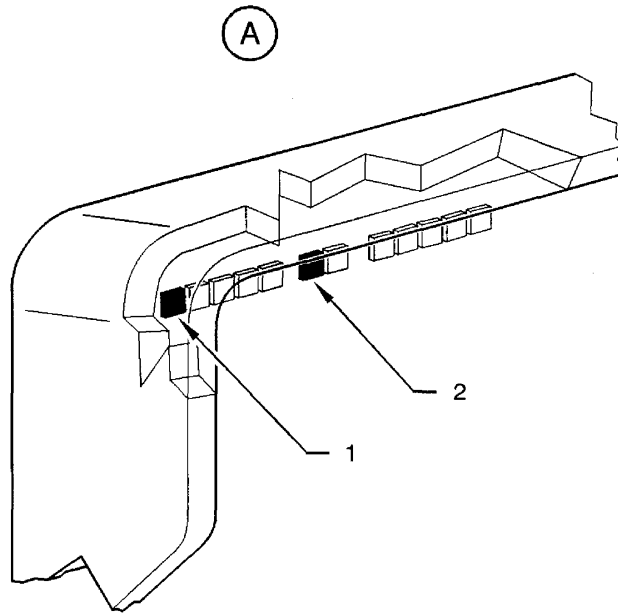


Normal distribution - Adjustment of the regulating valve
Figure 501

14371100AAAAYZ4001



- 1 - "GYRO SUCT" red warning light
- 2 - "TEST" button
- 3 - Pressure indicator



I4371200AAA BVZ4200

Normal distribution - Test of the normal distribution system
Figure 502

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NORMAL DISTRIBUTION

INSPECTION / CHECK

1. CHECK OF THE NORMAL DISTRIBUTION SYSTEM (Figures 601, 602 and 602A)

A. Tools and consumable materials

None

B. Procedure

- 1) Remove engine cowling 121 - refer to 71-10-01.
- 2) If installed, remove inspection door 211L and, if necessary, remove inspection door 211R - refer to 06-30-00.

NOTE : The instruments may also be installed on the R.H. instrument panel.

- 3) Tilt the L.H. instrument panel and, if necessary, the R.H. instrument panel - refer to 31-10-01.
- 4) Inspect hoses (2) for :
 - clamp tightening,
 - cracking, pinching or fretting wear,
 - correct position in the clips,
 - attachment with tie-wraps, without crushing,
 - presence and attachment of plugs (4), if there is only one instrument.
- 5) Inspect filter (1) for :
 - condition and cleanliness,
 - attachment.
- 6) Inspect regulating valve (5) for :
 - filter condition and cleanliness,
 - attachment to the firewall,
 - locking of the flow cock,
 - correct connection of the wires of S67 pressure switch (if installed).
- 7) Inspect pressure indicator (3) for :
 - attachment,
 - blockage of the air vent fitting.
- 8) Inspect vacuum pump (14) for :
 - tightening and marking of nuts (13) securing the pump to the rear table,
 - oil seepage from the drive shaft,
 - tightening of unions (12) and (15) on the pump body.

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AIRBORNE installation

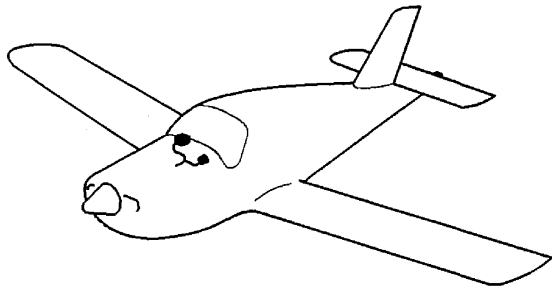
- 9) Inspect hose (11) for :
- clamp tightening,
 - cracking, pinching or fretting wear.

SIGMATEK, CHAMPION or AERO ACCESSORIES installation

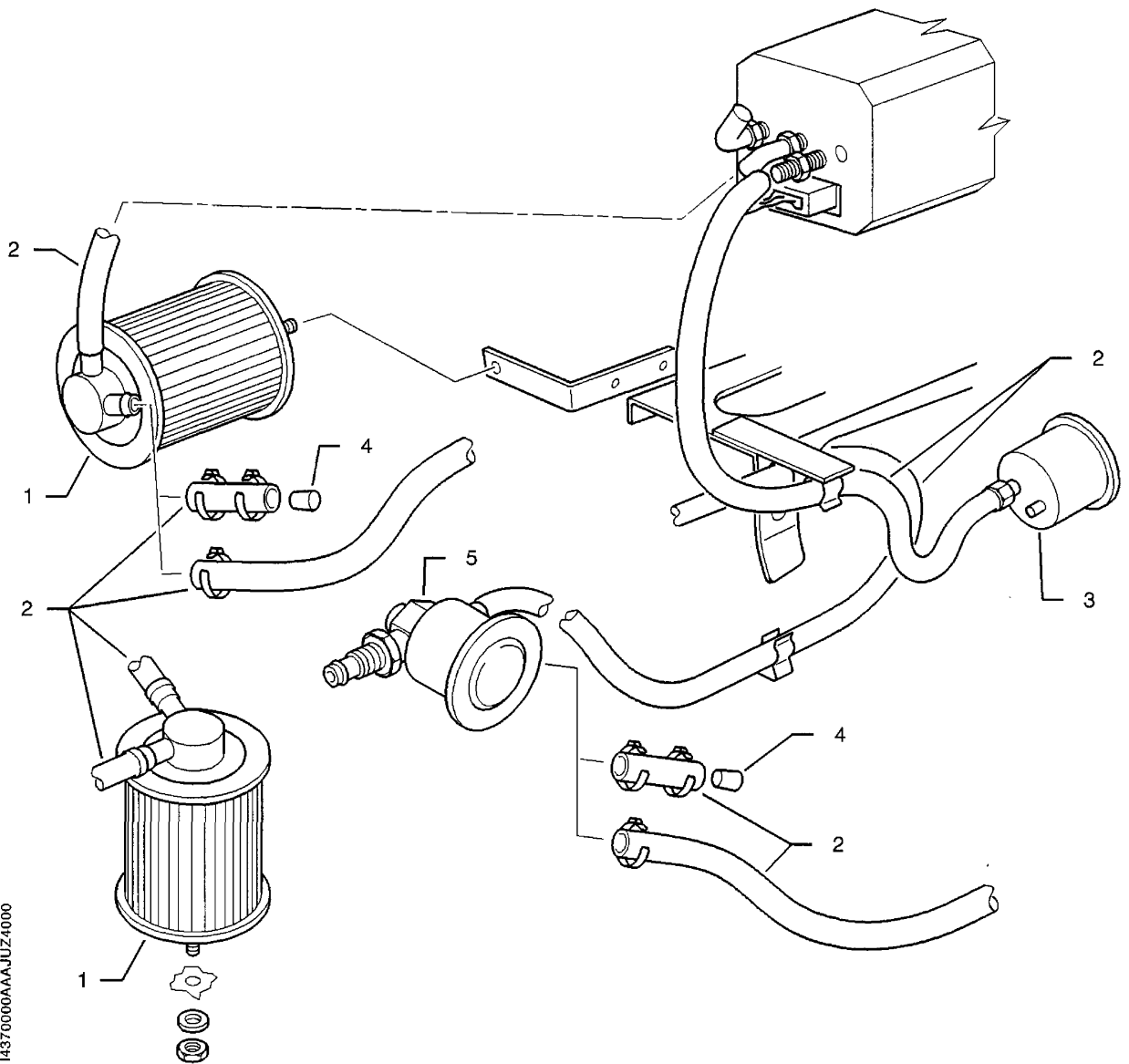
- 9) Inspect hoses (11) and (21) for :
- clamp tightening,
 - cracking, pinching or fretting wear.
- 10) Inspect hose (23) for :
- clamp tightening,
 - cracking, pinching or fretting wear,
 - routing and attachment,
 - blockage of the hose at its end.
- 11) Inspect filter (22) for :
- general condition,
 - tightening of clamps (24) and (25),
 - condition of the protections on clamp (24) and on the engine mount.

All

- 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) Lock the L.H. instrument panel and, if tilted, the R.H. instrument panel.
- 15) Test the normal distribution system - refer to Page 501.
- 16) Install inspection door 211L and, if removed, inspection door 211R - refer to 06-30-00.

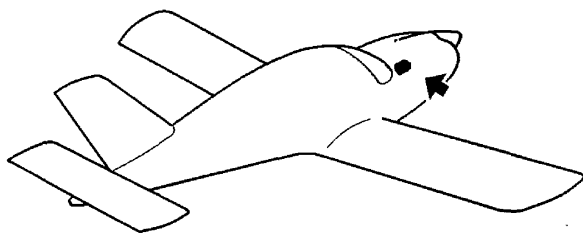


- 1 - Filter
- 2 - Hose
- 3 - Pressure indicator
- 4 - Plug
- 5 - Regulating valve

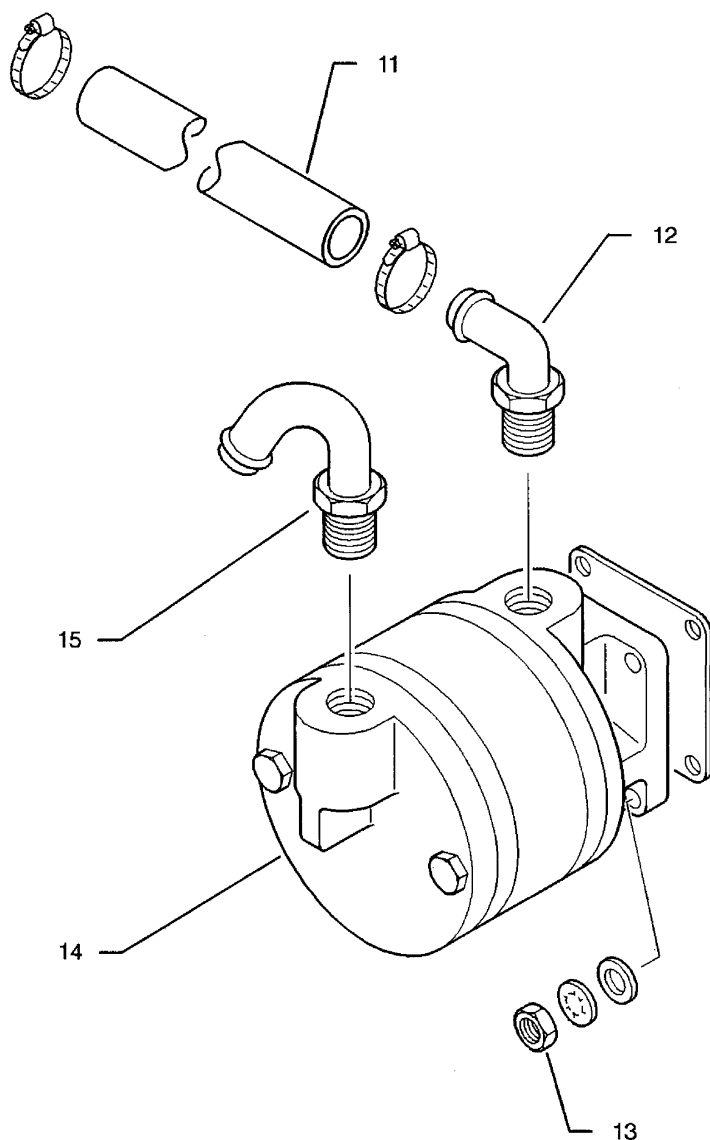


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Normal distribution - Inspection / Check
Figure 601

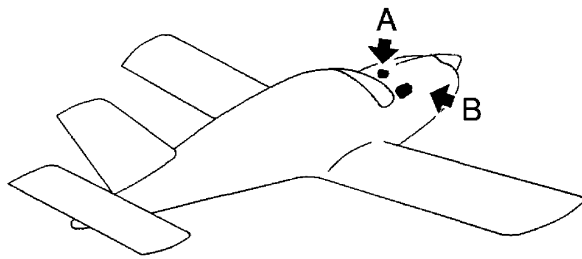


- 11 - Hose
- 12 - Union
- 13 - Nut
- 14 - Vacuum pump
- 15 - Union

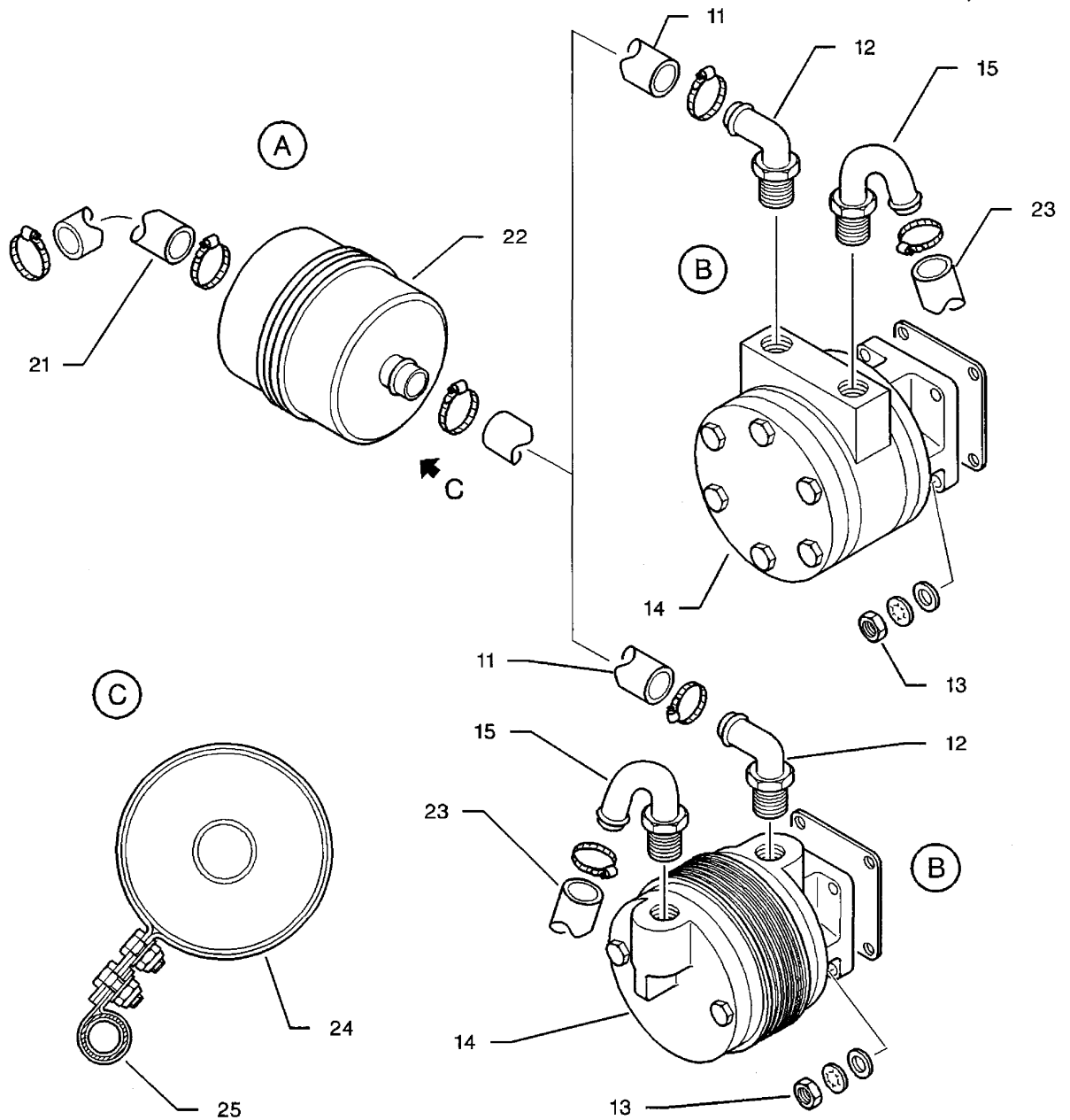


14370000AAAAMVZ4000

Normal distribution - Inspection / Check
Figure 602 - AIRBORNE



- 11 - Hose
- 12 - Union
- 13 - Nut
- 14 - Vacuum pump
- 15 - Union
- 21 - Hose
- 22 - Filter
- 23 - Hose
- 24 - Clamp
- 25 - Clamp



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Normal distribution - Inspection / Check
Figure 602A - SIGMATEK, CHAMPION or AERO ACCESSORIES

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VACUUM PUMP

REMOVAL / INSTALLATION

1. REMOVAL OF THE VACUUM PUMP (Figure 401)

A. Tools and consumable materials

- Blanking caps and plugs

B. Removal of the AIRBORNE vacuum pump

- Simple operation, not described.

NOTE : The AIRBORNE vacuum pump removal / installation procedure is similar to that of the SIGMATEK, CHAMPION or AERO ACCESSORIES pump, except as regards the filter.

C. Removal of the SIGMATEK, CHAMPION or AERO ACCESSORIES vacuum pump

- 1) Remove engine cowlings - refer to 71-10-01.
- 2) Remove clamps (3) and disconnect hoses (2) and (6). Blank off.
- 3) Remove nuts (12), lockwashers (11) and washers (10). Discard lockwashers (11).
- 4) Remove and blank off vacuum pump (13).

NOTE : Firmly hold adapter (7) to avoid removing it with vacuum pump (13).

- 5) Discard seal (9) and drive seal (8).
- 6) If necessary, remove 90° elbow (4) and elbow (5). Blank off.
- 7) Carefully clean 90° elbow (4) and elbow (5).
- 8) If necessary, remove filter (14).
 - a) Remove clamps (1) and disconnect hoses (2) and (15). Blank off.
 - b) Remove and discard nuts (18), remove washers (19) and bolts (23).
 - c) Remove filter (14) and clamp (16).

2. INSTALLATION OF THE VACUUM PUMP (Figure 401)

A. Tools and consumable materials

- Lubricant (TB 06-903C)

B. Installation of the SIGMATEK, CHAMPION or AERO ACCESSORIES vacuum pump

- 1) If 90° elbow (4) and elbow (5) have been removed, perform the following operations :
 - a) Spray the threads of 90° elbow (4) and elbow (5) with lubricant (TB 06-903C).
 - b) Install and hand-tighten 90° elbow (4) and elbow (5) on vacuum pump (13).
 - c) Direct elbow (5) to the right and 90° elbow (4) to the left by screwing from ½ turn minimum to 1.5 turn maximum with a wrench.
- 2) Install new drive seal (8) in adapter (7).
- 3) Install new seal (9) and vacuum pump (13). Secure with washers (10), new lockwashers (11) and nuts (12).

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- 1 - Clamp
- 2 - Hose
- 3 - Clamp
- 4 - 90° elbow
- 5 - Elbow
- 6 - Hose
- 7 - Adapter
- 8 - Drive seal
- 9 - Seal
- 10 - Washer
- 11 - Lockwasher
- 12 - Nut
- 13 - Vacuum pump
- 14 - Filter
- 15 - Hose
- 16 - Clamp
- 17 - Protection sleeve
- 18 - Nut
- 19 - Washer
- 20 - Engine mount
- 21 - Clamp
- 22 - Adhesive protection tape
- 23 - Bolt

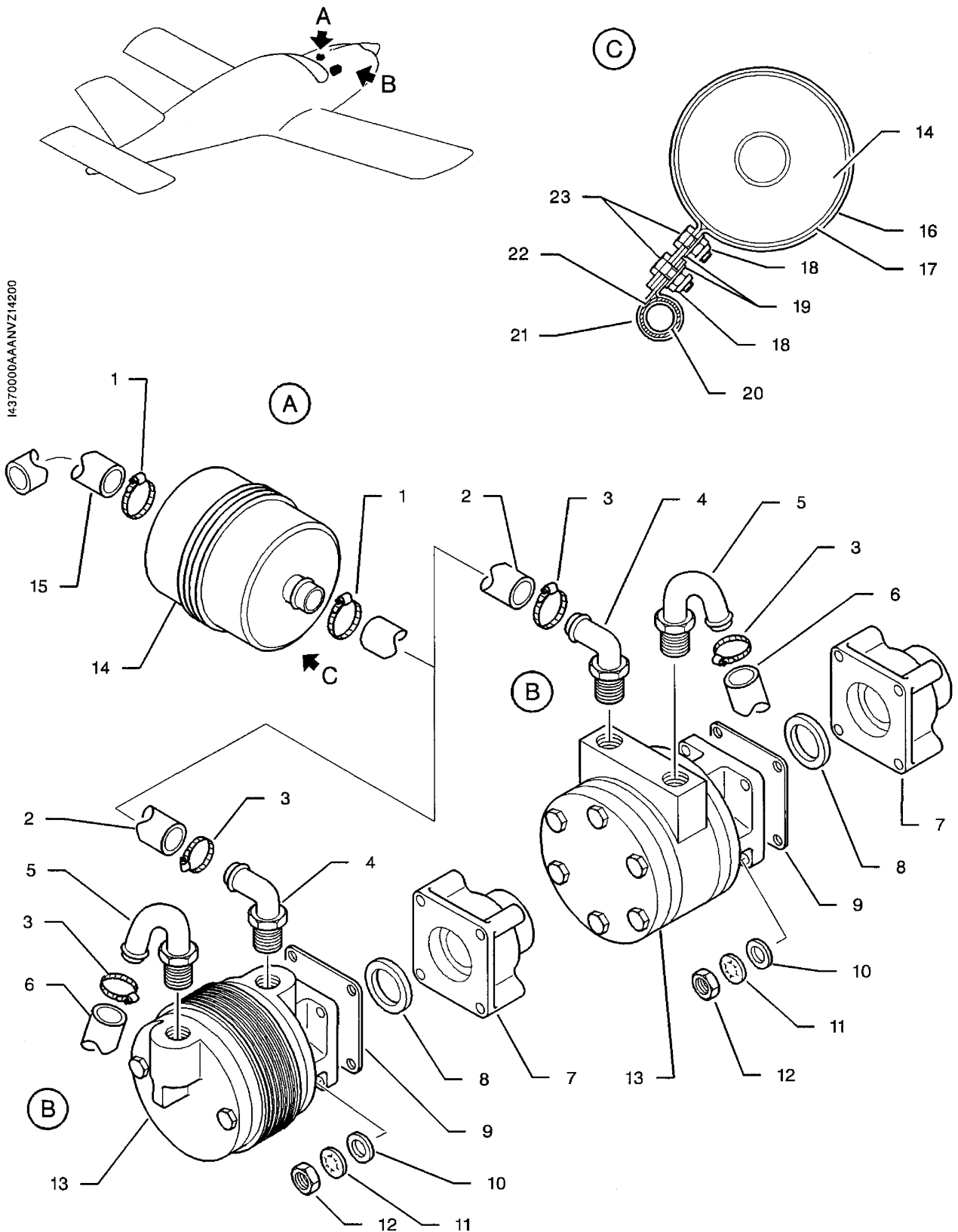
Vacuum pump - Removal / Installation
Key to Figure 401

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Vacuum pump - Removal / Installation
Figure 401

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- 4) Torque according to "Specific cases" tightening procedure - refer to 20-00-01.
- 5) Connect hose (2) to 90° elbow (4) and secure with clamp (3).
- 6) Connect hose (6) to elbow (5) and secure with clamp (3).
- 7) If removed, install filter (14).
 - a) Inspect adhesive protection tape (22) on engine mount (20) and protection sleeve (17) of clamp (16) for correct condition, replace if necessary.
 - b) Install clamp (16) on filter (14) and secure with bolt (23), washer (19) and new nut (18).
CAUTION : THE FILTER MUST BE INSTALLED WITH THE ARROW POINTING TOWARDS THE VACUUM PUMP.
 - c) Install clamp (21) on engine mount (20) over adhesive protection tape (22).
 - d) Secure filter (14) / clamp (16) assembly to clamp (21) using bolt (23), washer (19) and new nut (18).
 - e) Connect hose (15) to filter (14) and secure with clamp (1).
 - f) Connect hose (2) to filter (14) and secure with clamp (1).
- 8) Make sure all the tools and materials are removed and the work area is clean and free from debris.
- 9) Install engine cowlings - refer to 71-10-01.
- 10) Perform a maintenance run-up - refer to 05-30-01.
- 11) Test the normal distribution system - refer to 37-11-00.
- 12) Remove engine cowling 121 - refer to 71-10-01.
- 13) Check for leaks at the vacuum pump drive.
- 14) Install engine cowling 121 - refer to 71-10-01.

INDICATING
DESCRIPTION AND OPERATION

1. GENERAL

The aircraft can be equipped with two types of vacuum system indicating :

- the pressure indicator (normal system),
- the "GYRO SUCT" warning light (normal system),

The system also uses M6 advisory panel - refer to 31-50-01.

2. LOCATION

COMPONENT	QTY	AREA	ACCESS DOOR	REFERENCE
Pressure indicator	1	250	/	37-20-00
"GYRO SUCT " warning light	1	250	/	37-20-00

3. DESCRIPTION (Figure 1)

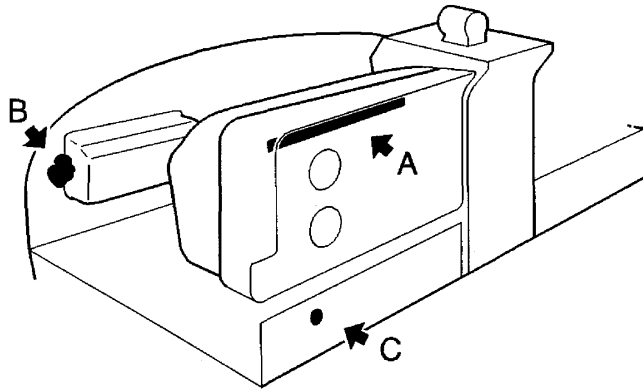
A. Pressure indicator

The pressure indicator is calibrated in inches of mercury and indicates the suction available for the operation of the attitude gyro indicator and the directional gyro indicator. The required suction range is 4.4 to 5.2 in.Hg.

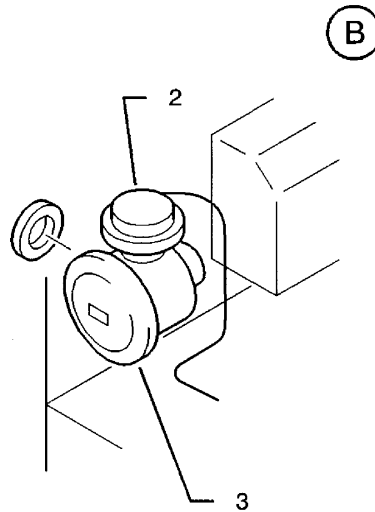
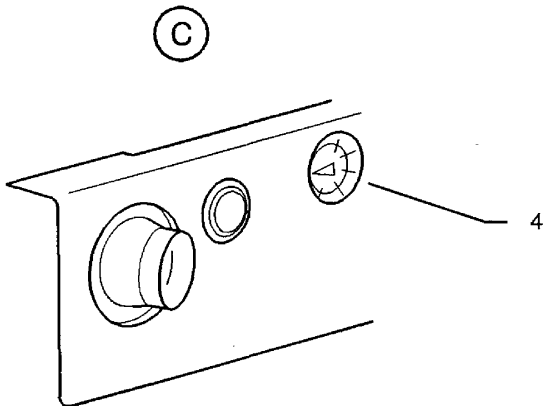
A suction reading outside this range may indicate a system malfunction or improper adjustment, in this case, the indicators should not be considered reliable.

B. "GYRO SUCT" warning light (normal system)

The normal system can be provided with an alarm, red warning light labeled "GYRO SUCT" on M6 advisory panel ; this warning light, indicating insufficient suction, illuminates between 3 and 3.5 in.Hg, via S67 pressure switch.



- 1 - "GYRO SUCT" warning light
- 2 - S67 pressure switch
- 3 - Regulating valve
- 4 - Pressure indicator



14371200AAAABVZ4100

Vacuum system indicating
Figure 1