

22

AUTO FLIGHT

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**AUTO FLIGHT
DESCRIPTION AND OPERATION**

1. GENERAL

This chapter describes components and equipment for aircraft automatic flight control.
It includes equipment and components which control roll axis.

2. DESCRIPTION

The aircraft is equipped with an autopilot – refer to 22–10–00.

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AUTOPILOT

DESCRIPTION AND OPERATION

1. GENERAL

The autopilot combines all auto flight functions in a single computer.

2. DESCRIPTION

The section describes the autopilot systems CENTURY I, IIB and 21 – refer to 22–11–00.

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AUTOPILOT

DESCRIPTION AND OPERATION

1. GENERAL (Figures 1, 1A and 1B)

The optional autopilot system is of the "single axis" type, it controls the aircraft roll.

The autopilot system consists of :

- the flight computer,
- the roll servo-actuator.

The autopilot system also uses :

- the artificial horizon (roll information),
- the navigation system (VOR / LOC),
- the heading reference system.

The heading reference system can be either a directional gyro or a slaved heading system.

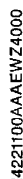
The slaved heading system (if installed) consists of :

- a slaving amplifier,
- a flux valve,
- an HSI,
- a GYRO MODES selector of the selection panel.

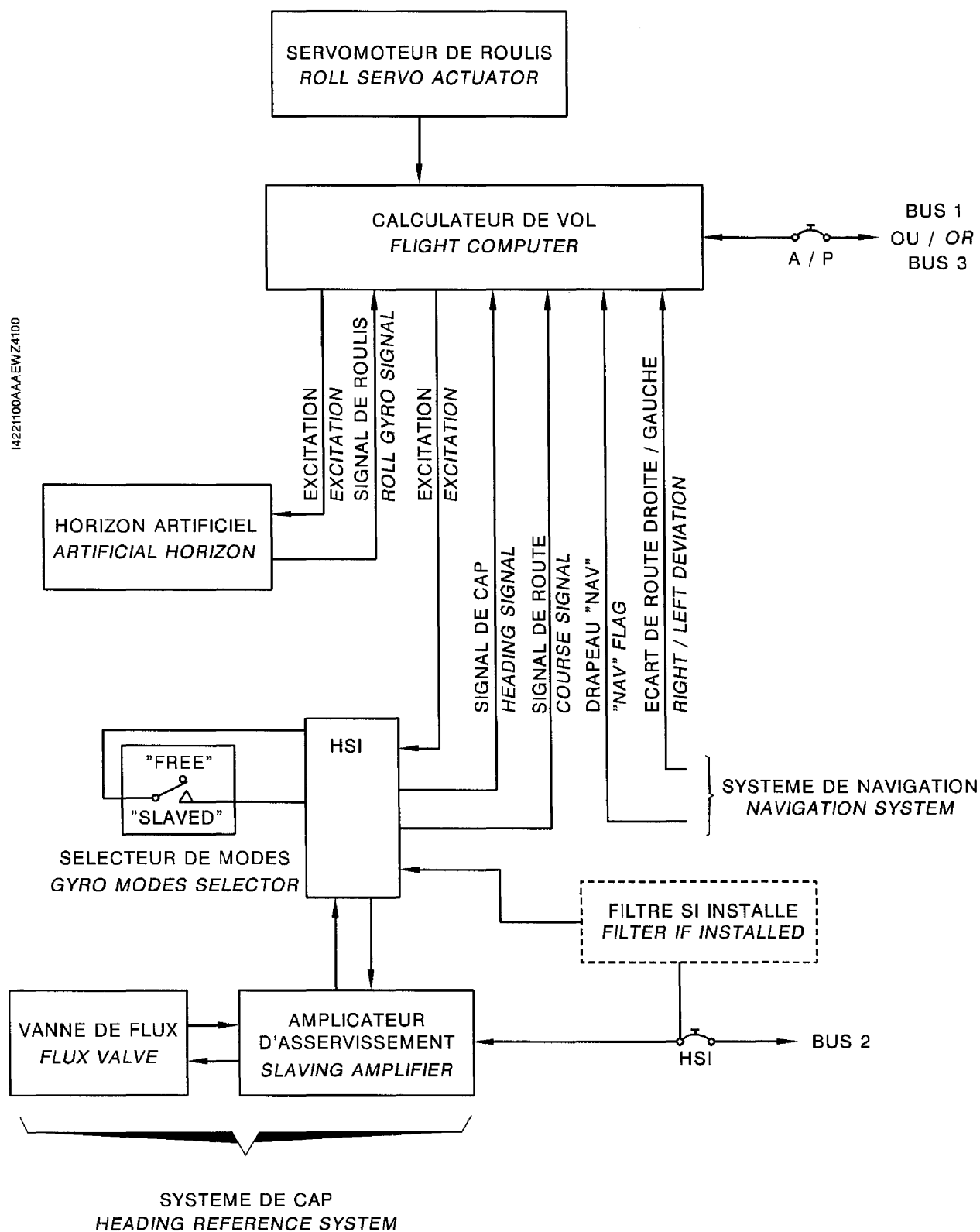
The autopilot system is electrically supplied by "BUS 1" or "BUS 3" bars.

2. LOCATION (Figure 2)

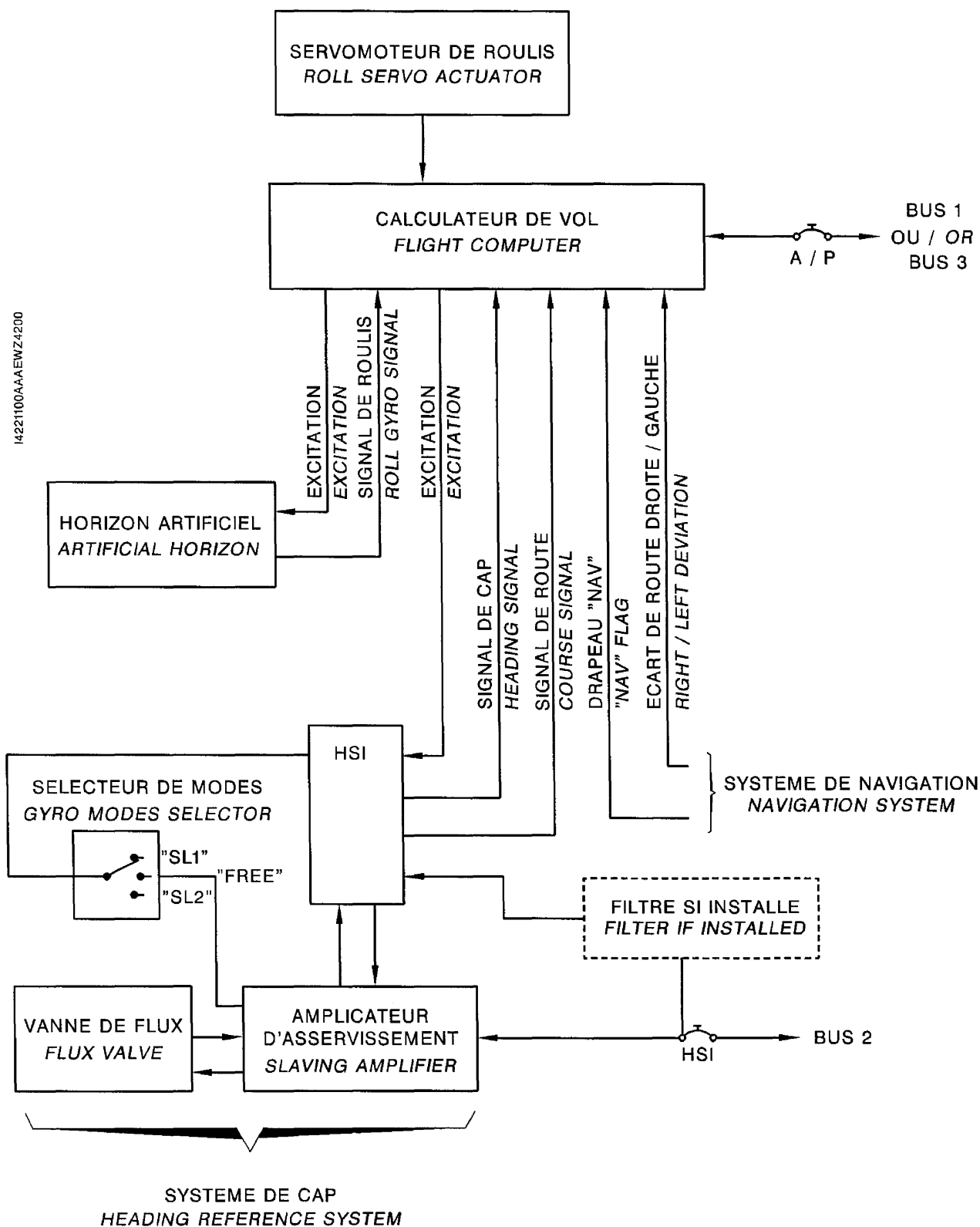
COMPONENT	QTY	AREA	ACCESS DOOR	REFERENCE
Flight computer	1	250	251C	22-11-00
Roll servo-actuator	1	500	512	22-11-00
Circuit breaker : – "A / P"	1	230	232L	WM



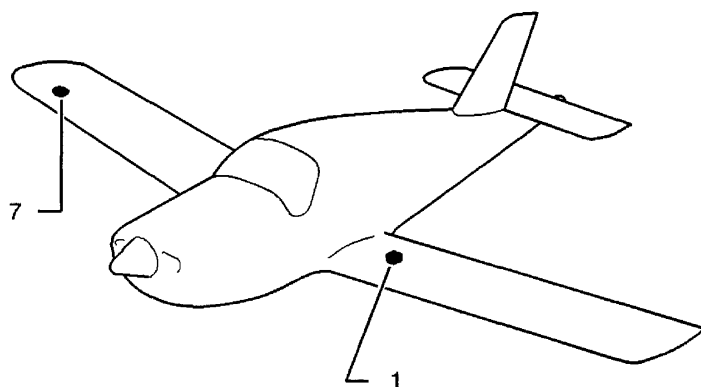
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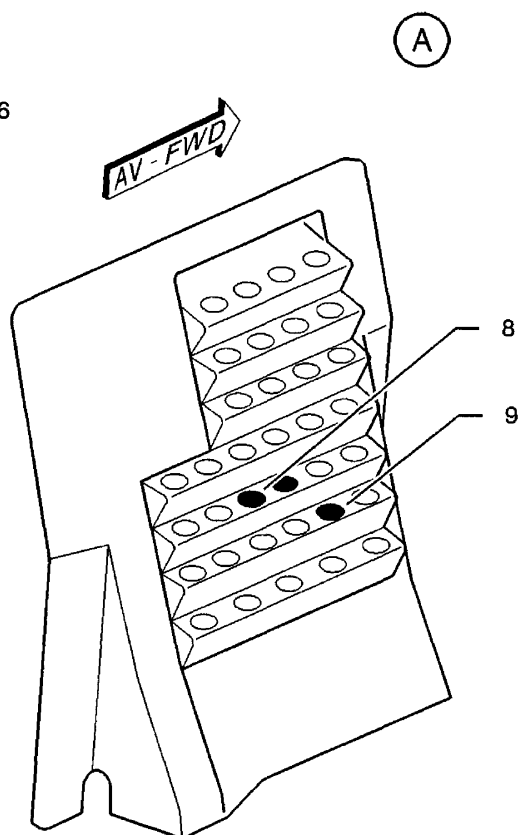
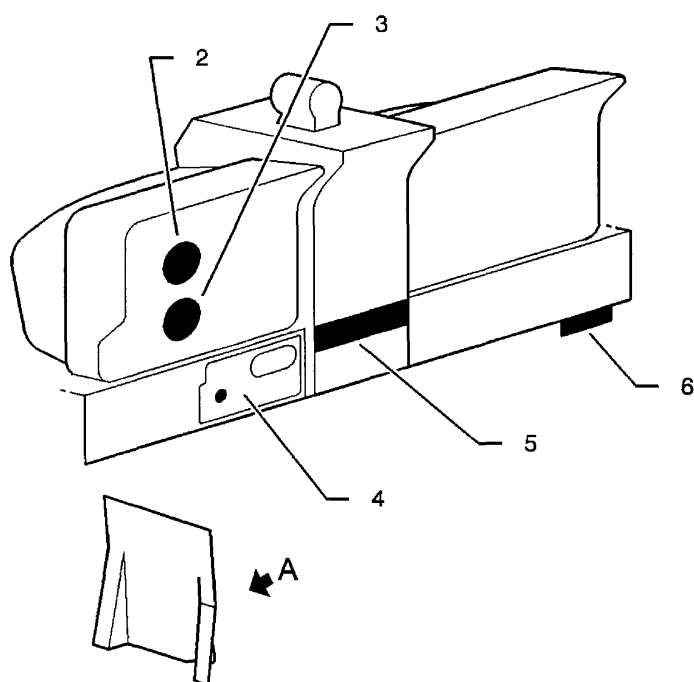
Autopilot – Electrical schematic
Figure 1A – With HSI and 1D 755 slaving amplifier



Autopilot – Electrical schematic
Figure 1B – With HSI and 1C 714 slaving amplifier



- 1 – Roll servo-actuator
- 2 – Artificial horizon
- 3 – Directional gyro or HSI
- 4 – Selection panel
- 5 – Flight computer
- 6 – Slaving amplifier
- 7 – Flux valve
- 8 – A / P circuit breaker
- 9 – HSI circuit breaker (if installed)



14221100AAADVZ4100

Autopilot – Identification and location of components
Figure 2

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AUTOPILOT
MAINTENANCE PRACTICES

1. SERVICING

None

2. REMOVAL / INSTALLATION – SERVO-ACTUATOR (Figure 201)

A. Tools and consumable materials

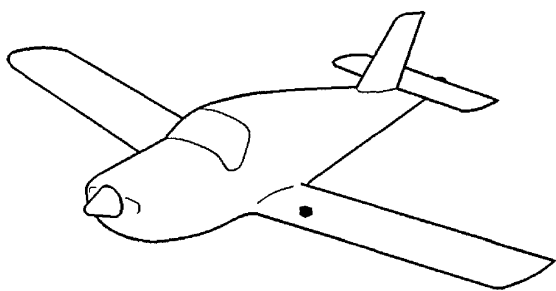
None

B. Removal

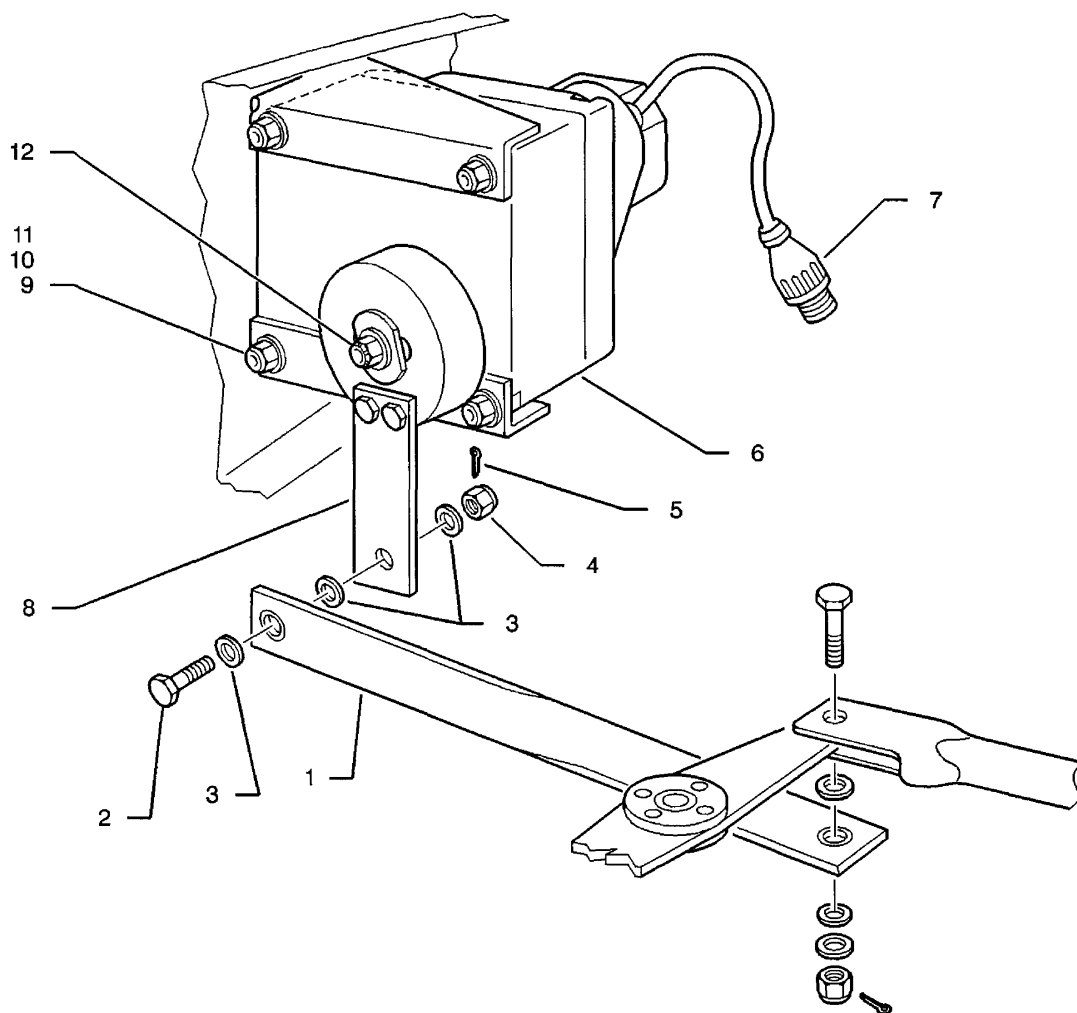
- 1) Open A / P circuit breaker.
- 2) Remove the access door located under L.H. wing 512.
- 3) Disconnect the connector (7).
- 4) Uncouple the rod (1) on crankpin (8). Retain the nut (4), washers (3) and the bolt (2). Discard the cotter pin (5).
- 5) Hold the servo-actuator (6) and retain bolts (9), washers (10). Discard nuts (11).
- 6) Place the servo-actuator on a work bench.

C. Installation

- 1) Position the servo-actuator (6).
- 2) Secure the servo-actuator (6) with bolts (9), washers (3) and new nuts (11).
- 3) Secure the rod (1) to the crankpin (8) with the bolt (2), the washers (3), the nut (4). Lock with a new cotter pin (5).
- 4) Connect the connector (7).
- 5) Install the access door 512.
- 6) Close A / P circuit breaker.



- 1 – Rod
- 2 – Bolt
- 3 – Washer
- 4 – Nut
- 5 – Cotter pin
- 6 – Servo-actuator
- 7 – Connector
- 8 – Crankpin
- 9 – Bolt
- 10 – Washer
- 11 – Nut
- 12 – Setting nut



Servo-actuator – Removal / Installation
Figure 201

I4221200AAA/EWZ4000

3. ADJUSTMENTS / TESTS – SERVO–ACTUATOR

A. Tools and consumable materials

- 2 seal retainers
- 2 protection shims
- 1 dynamometer

B. Tests on table

- 1) Install the servo–actuator on the work bench according to Detail A, Figure 202.
- 2) Uncouple the dynamometer.
- 3) Connect electrically according to Detail B, Figure 202.
- 4) Close "K" switch ; this actuates the engagement and the crankpin turns ; to reverse direction of rotation, tilt "J".
- 5) Open "K" to stop ; attach the dynamometer to the crankpin hinge line.
- 6) Close "K".
- 7) Read the corresponding force on the dynamometer and compare it with Paragraph 3D.
- 8) Open "K".
- 9) Reset if necessary, then safety nut in position – refer to Paragraph 3C.

C. Setting of servo–actuator stress limiter

- 1) Remove the servo–actuator so as to test stress limiter on work bench – refer to Paragraph 2 B.
- 2) The stress limit is defined at the link. It must be measured with the dynamometer in the rotation plane of the hinge line. The pull direction must draw a 90° angle with the lever arm.

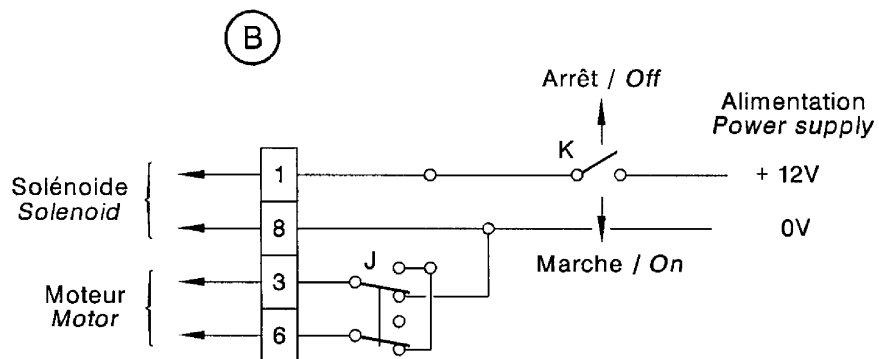
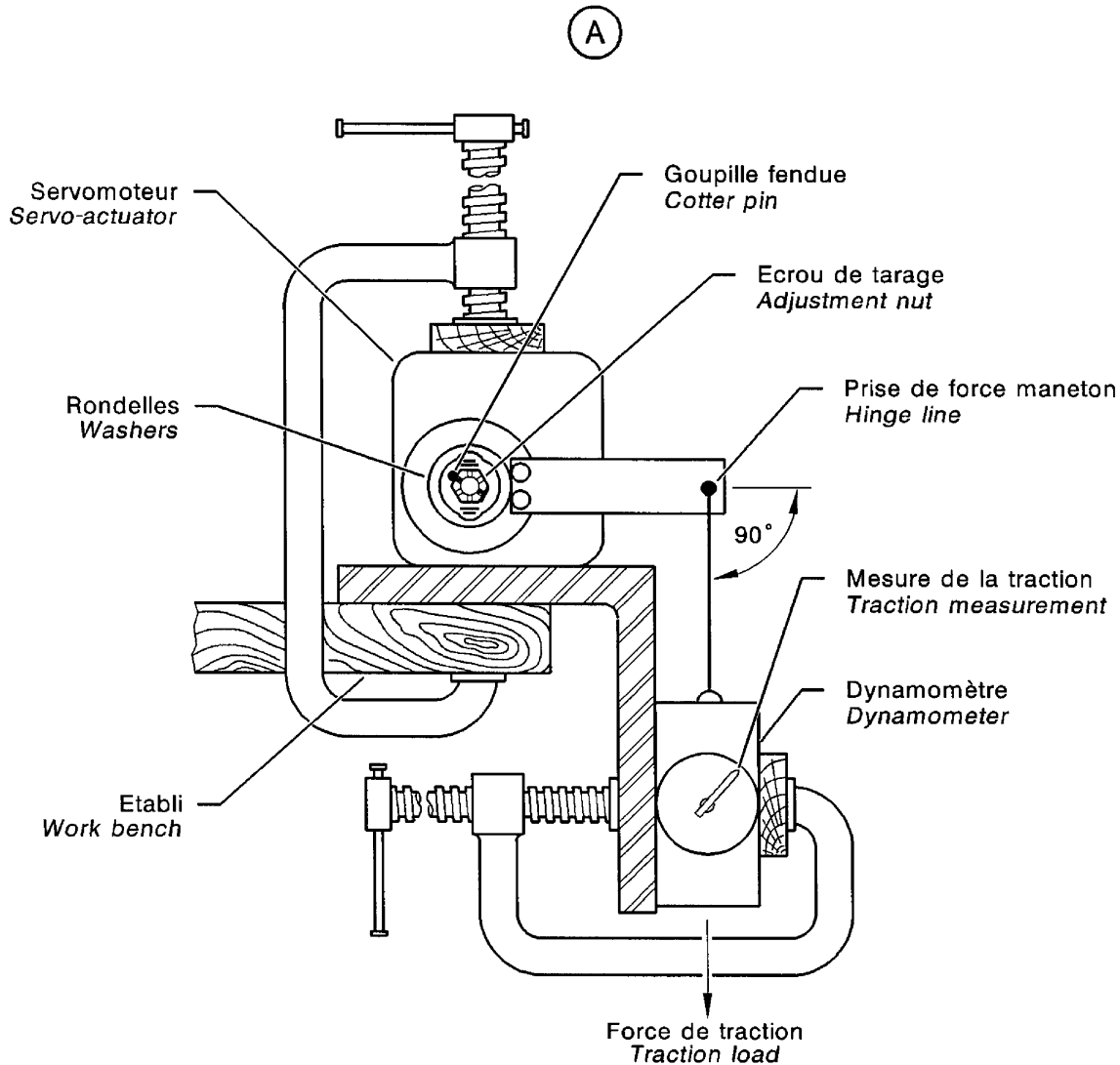
To change the adjustment, unpin the lockwasher, tighten to increase the stress limit value, untighten to decrease it.

CAUTION : AFTER SERVO–ACTUATOR STRESS LIMITER ADJUSTMENT, DO NOT FORGET TO SAFETY THE NUT WITH A COTTER PIN

THE NUT IS CONSIDERED SAFETIED ONLY AFTER ITS NOTCHES LINE UP WITH ONE OF THE BOLT PIN HOLES. FOR THIS, DO NOT HESITATE TO COMPLETELY REMOVE THE NUT SO AS TO ADD OR REMOVE ONE OR SEVERAL WASHERS IF NECESSARY

D. Tolerance ranges of maximum stresses

Nominal	:	20 lbs	9	kg
Tolerances	:	± 5 lbs	± 2,26	kg



Servo-actuator – Adjustment / Test
Figure 202

14221200AAADWZ4000

4. INSPECTION / CHECK

A. Tools and consumable materials

- a rule, 137.80 in (3500 mm) length
- a weight of 2.20 lbs (1 kg)

B. Check of autopilot servo-actuator

- 1) Engage the autopilot on ground and check that the overriding torque at the control wheel is less than 147.56 in.lbs (1700 mm.kg) for an autopilot motor P/N 1C 508-1-528 R – see Figure 203.
- 2) Engage the autopilot on ground and check that the overriding torque at the control wheel is less than 98.43 in.lbs (1134 mm.kg) for an autopilot motor P/N 1C 508-1-802 R – see Figure 203.
- 3) Check tightening of the servo-actuator coupling rod on the aileron control rod.

C. Check of vacuum pump system – refer to 37-11-00

Check vacuum pump system filter for clogging.

The filter may be reached through the L. H. upper door on the firewall 211L.

D. Functional check

After any rectification on servo-actuators, check operation on aircraft so as to make sure that no electrical or mechanical reversal was carried out during the corrective action.

- 1) Tests on ground

NOTE : Aircraft levelled.

Engine running, gyros cranked, before engagement of the autopilot check that suction gage lies between 4.4 and 5.2 in.Hg and that the aircraft mains voltage is not under 12 volts.

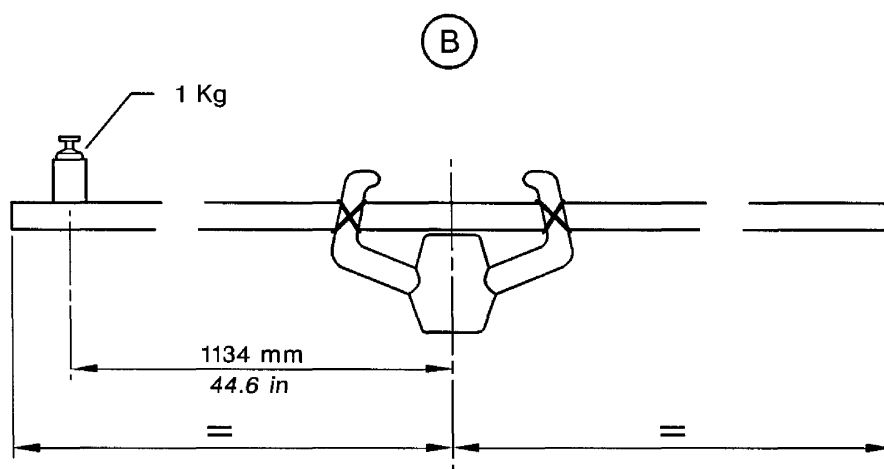
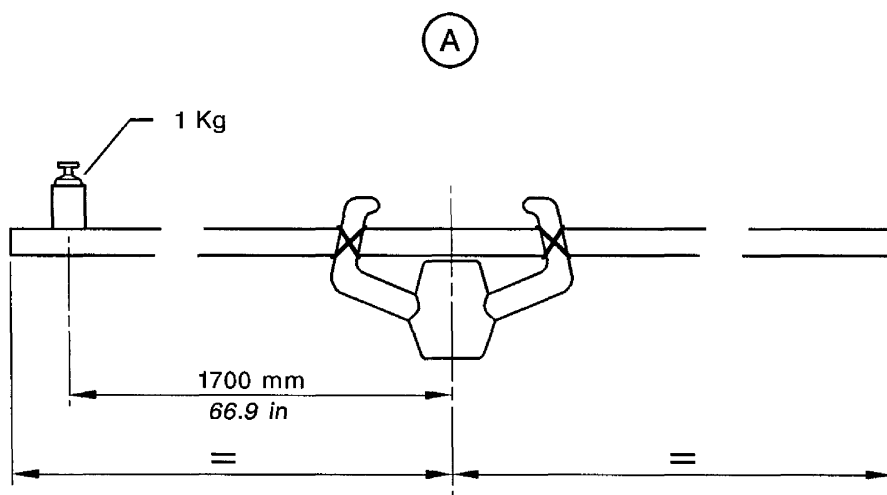
Center heading bug on heading indicator.

- a) Roll function

- Autopilot : "ON",
- Select HGD mode,
- Turn heading bug to the right 20° :
 - . Control wheel turns to the right,
 - . R.H. aileron lifts up.
- Turn heading bug to the left 20° :
 - . Control wheel turns to the left,
 - . L.H. aileron lifts up.
- With heading bug to the left and control wheel fully deflected to the left, test that it is possible to manually override autopilot action by bringing control wheel back to centre.
- Autopilot : "OFF".

- b) Flight tests

Conform to procedures given in aircraft "Pilot's Operating Handbook".



I4221100AAA DVZ4200

Servo-actuator – Inspection / Check
Figure 203