



PILATUS AIRCRAFT LTD. CH-6371 STANS, SWITZERLAND

# SERVICE BULLETIN

SERVICE BULLETIN NO: 29-009

REF NO: 81

MODIFICATION NO:

ATA CHAPTER: 29

## HYDRAULIC POWER - AUXILIARY INSPECTION AND PROOF TEST OF THE CABLE FOR THE EMERGENCY OPERATION OF THE LANDING GEAR

### 1. Planning Information

#### A. Effectivity

PC-9 aircraft from MSN 101 thru MSN 247 and MSN 501 thru MSN 567.

#### B. Concurrent Requirements

None.

#### C. Reason

##### (1) Problem

The cable that operates the emergency package for emergency operation of the landing gear can break. This is a dormant failure and will not be found until:

- Selection of the emergency landing gear
- The scheduled function test of the landing-gear emergency-extension-system operation.

##### (2) Cause

A bend or damage to the outer cable conduit or corrosion of the inner core of the cable.

##### (3) Solution

Do a check of the routing of the cable and do a proof test of the cable.

#### D. Description

This Service Bulletin gives the data and the instructions to do a check and test of the EMER LDG GR handle and cable assembly.

#### E. Compliance

Mandatory.

Required at the next Scheduled Servicing but not later than six months after the effective date of this Service Bulletin.

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**F. Approval**

The technical aspects of this Service Bulletin have been approved by the Federal Office for Civil Aviation (FOCA) of Switzerland as an Airworthiness Directive.

PILATUS advises Operators/Owners to check with their local Airworthiness Authorities for any changes, local regulations or sanctions that may affect the embodiment of this Service Bulletin.

**G. Manpower**

	Inspection only	Replacement of the Cable
Preparation	0.5	0.5
Inspection and test	0.5	-
Replacement of cable	-	10.5
Close up	0.5	0.5
<b>TOTAL MAN-HOURS</b>	<b>1.5</b>	<b>11.5</b>

**NOTE:** Man-hours figures do not include the time required to cure sealants and adhesives.

**H. Weight and Balance**

**(1) Weight Change**

Not affected.

**(2) Moment Change**

Not affected.

**I. Electrical Load Data**

Not changed.

**J. Software**

Not changed.

**K. References**

Aircraft Maintenance Manual (AMM), 07-10-00, 12-00-00, 12-10-05, 24-00-00, 25-10-00, 25-10-01, 29-00-01 and 32-30-01.

**L. Publications Affected**

Not affected.

**M. Interchangeability of Parts**

Not affected.

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**2. Material Information**

**A. Material - Price and Availability**

Operators should send orders for the bowden cable, to:

PILATUS AIRCRAFT LTD,  
CUSTOMER LIAISON MANAGER,  
CH 6371 STANS,      Tel: +41 41 619 65 09 (Government)  
SWITZERLAND      Fax: +41 41 619 61 70

**B. Material Necessary for Each Aircraft**

**(1) Material to be Purchased**

Part Numbers, given in this Service Bulletin, are correct at the time of approval. PILATUS AIRCRAFT LTD. reserves the right to change the part numbers as necessary.

Part No.	Description	Qty
529.20.09.120	Bowden Cable	1

**NOTE:** The bowden cable is the replacement for a defective cable.

**(2) Operator Supplied Material**

Part No.	Description	Qty	Remarks
908.18.12.081 or 908.18.12.083	Corrosion Preventative Compound (CPC) - light	A/R	Item No. P10-005A Item No. P10-005B
919.01.11.104	Lockwire (standard)	A/R	Item No. P02-001 0,8 mm (0,032 in) diameter
918.71.03.121	indicating thread	A/R	Red colored
940.17.55.661	Spring, Cotter	1	(Vendor P/N VSM12785/3*16)

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**C. Tooling - Cost and Availability**

Part No.	Description	Cost	Availability
960.10.02.901	Hydraulic servicing rig	N/A	Pilatus Standard Tool
513.57.09.028	Ground lock (Air Brake)	N/A	Pilatus Standard Tool
110.88.07.065	Safety clip Qty 3	N/A	Pilatus Standard Tool
N/A	Spring balance Qty 1	N/A	Local Purchase To measure 57 kg
N/A	Strap Qty 1	N/A	Local Purchase To hold 57 kg
N/A	Pin Punch Qty 1	N/A	Local Purchase To remove 3 mm pin
N/A	Soft nosed pliers Qty 1	N/A	Local Purchase

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**3. Accomplishment Instructions - Aircraft (Ref. Fig. 1)**

**WARNING:** MAKE SURE THAT BOTH EJECTION SEATS HAVE THE SAFETY PINS INSTALLED IN THE SAFE FOR SERVICING LOCATIONS BEFORE YOU GO INTO THE COCKPIT (REF. AMM, 25-10-00, PAGE BLOCK 201).

**A. Preparation**

- (1) Put the aircraft on jacks (Ref. AMM, 07-10-00, Page Block 201).
- (2) Open access panels ENG 3L and ENG 3R, F6 and LB0 (Ref. AMM, 12-00-00, Page Block 1).
- (3) Open and install a safety clip to the circuit breaker:  

LDG GR HANDLE (front cockpit BATTERY BUS CB panel).
- (4) Connect the hydraulic servicing rig (rig) to the aircraft (Ref. AMM 29-00-01, Page Block 201).
- (5) Energize the aircraft electrical system (Ref. AMM, 24-00-00, Page Block 201).

**WARNING:** MAKE SURE PERSONNEL AND EQUIPMENT ARE CLEAR OF THE AREA BELOW THE AIR BRAKE AND MAIN GEAR DOORS BEFORE YOU OPERATE THE HYDRAULIC RIG OR EMERGENCY LANDING GEAR HANDLE.

**CAUTION:** MAKE SURE THE POSITION OF THE SWITCHES ON THE SWITCH BOX AGREES WITH THE POSITION OF THE LANDING GEAR AND AIR BRAKE BEFORE YOU SET THE POWER SWITCH TO "ON". WHEN THE POWER SWITCH IS "ON", HYDRAULIC PRESSURE WILL BE APPLIED TO THOSE SERVICES SELECTED ON THE SWITCH BOX.

- (6) Set the rig to ON and the rig delivery pressure to 207 bar (3000 psi).
- (7) Move the air brake selector fully aft to extend the air brake.
- (8) Set the rig to OFF.
- (9) Install the ground lock on the air brake.
- (10) Set the N<sub>2</sub> INDICATION switch to ON.
- (11) Pull the DEPRESSURISE HYD ACCUMULATOR handle.
- (12) Set the N<sub>2</sub> INDICATION switch to OFF.
- (13) De-energize the aircraft electrical system (Ref. AMM, 24-00-00, Page Block 201).
- (14) Open and install a safety clip to the circuit breakers:  

AIR BRAKE (front cockpit GENERATOR BUS CB panel).

**B. Proof Test of the Bowden Cable**

- (1) Attach a strap to the EMER LDG GR handle (3).
- (2) Attach a spring balance to the strap.

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- (3) Push in the locking pin (2) and slowly pull the EMER LDG GR handle (3) aft. Record the pull force required for the operating lever (41) to engage with the locking latch (43).
- (4) If the force recorded at Step (3) is more than 35 kg, do steps (a) thru (c) as applicable
  - (a) Apply a force by hand to see if the bolt assembly (46) is free to turn.
  - (b) If the bolt assembly (46) is free to turn, do Step (c).
  - (c) Examine as far as possible the bowden cable conduit (12) between the EMER LDG GR handle assembly and the clamp assembly (44).

Small radii bends and damage to the cable conduit can cause unwanted loads on the cable.

Do not remove the ejection seats or panels to do this examination.

- (i) Inspect the bowden cable conduit for sharp, tight or unwanted bends in the cable. Adjust the cable conduit as necessary until the conduit routing does not have sharp, tight or unwanted bends.
  - (ii) If you adjusted the routing of the cable in Step (i), do Step (3) again. If the force recorded at Step (3) is more than 35 kg, replace the bowden cable (Para. F).
- (d) If the bolt assembly (46) is not free to turn
  - (i) Make sure the bolt assembly (46) is assembled correctly.
  - (ii) Do a check of the adjustment of the bowden cable.
- (5) Continue to slowly pull on the EMER LDG GR handle (3) until the operating lever (41) does not move. With the operating lever (41) against its hard stop, apply a pull force of 57 kg. Hold the pull force for a minimum of 3 seconds.
- (6) Push the locking latch (43) to release the operating lever (41) and push the EMER LDG GR handle (3) fully forward.
- (7) Do Steps B. (3) thru (6) again.
- (8) If the inner cable (13) moves in the clamp bolt assembly (46) before 57 kg, do Steps C., D. and Step E., and then Step B. again, then Steps H. thru J.
- (9) If the bowden cable breaks, do Step F. to replace the bowden cable.
- (10) Disconnect the spring balance and the strap from the EMER LDG GR handle (3).

**C. Check of the Bowden Cable**

Small radii bends and damage to the cable conduit can cause unwanted loads on the cable.

Do not remove the ejection seats or panels to do this examination.

- (1) Examine as far as possible the bowden cable conduit (12) between the EMER LDG GR handle assembly and the clamp assembly (44).

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- (a) Inspect the bowden cable conduit for sharp, tight or unwanted bends in the cable. Adjust the cable conduit as necessary until the conduit routing does not have sharp, tight or unwanted bends
- (b) Inspect the bowden cable conduit to make sure it is not compressed at some position. If the conduit is compressed, replace the bowden cable and conduit (Para. F.).
- (c) Inspect the bowden cable conduit to make sure there is no damage to the outer cable conduit. If the conduit is damaged, replace the bowden cable and conduit (Para. F.).

**D. Corrosion Prevention of the Bowden Cable**

- (1) Loosen the lock nut on the clamp bolt assembly (46) and release the inner cable (13) from the operating lever (41).
- (2) Apply the Corrosion Preventative Compound (CPC-light) (Material No. P10-005A or B) to the free end of the inner cable (13).
- (3) Push in the locking pin (2) and pull the EMER LDG GR handle (3) aft for a distance of approximately 50 mm.

**NOTE:** A locking ball (6) is peened in position in the handle guide (5) . If the guide (5) has become worn it is possible that the locking ball (6) could be loose in the guide (5). Be careful if the handle assembly is pulled from the mounting (21).

- (4) Use the soft nose pliers and carefully pull the inner cable (13) back out from the bowden cable conduit (12). Remove and discard the loose pieces of teflon from the cable.
- (5) Do again the Steps D. (2) thru (4) four more times. Make sure the inner cable (13) has a smooth and free movement in the bowden cable conduit (12).

**E. Adjustment of the Bowden Cable**

- (1) Push the EMER LDG GR handle (3) forward.
- (2) Push the inner cable (13) through the clamp bolt assembly (46) on the operating lever (41). Do not tighten the lock nut.
- (3) Make sure the locking latch (43) for the operating lever (41) is disengaged, and the return spring (42) pulls the operating lever (41) fully forward.
- (4) Set the EMERG LDG GR handle (3) in the front cockpit so that it is 3 to 5 mm (0.12 to 0.20 in.) from the fully forward position. Tighten the clamp bolt assembly (46) on the operating lever (41). Make sure the position of the EMERG LDG GR handle (3) does not change when you tighten the clamp bolt assembly (46).
- (5) Do a Check of the mechanism that operates the valve, as follows:
  - (a) Pull the EMERG LDG GR handle (3) until the operating lever (41) has between 3,0 and 4,0 mm (0.120 and 0.160 in.) of movement before the locking latch (43) engages.
  - (b) Adjust the locknuts (40) and (45) on the microswitch (39) until the roller touches the cam and the microswitch (39) operates (audible click). Tighten the locknuts (40) and (45) on the microswitch (39).

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- (c) Pull the EMERG LDG GR handle (3) fully out and make sure that the locking latch (43) engages.
  - (d) Push the EMERG LDG GR handle (3) fully in and make sure that the locking latch (43) stays engaged.
  - (e) Release the locking latch (43) and make sure that the return spring (42) pulls the operating lever (41) and the EMERG LDG GR handle (3) to their fully forward positions.
- (6) Do Steps H. thru J.

**F. Replacement of the Bowden Cable**

- (1) Remove the front and rear ejection seats (Ref. AMM, 25-10-01, Page block 401).
- (2) Remove the LH lower side panels from the cockpit.
- (3) Disconnect the bowden cable from the emergency package:
  - (a) Loosen the clamp bolt assembly (46) and release the inner cable (13) from the operating lever (41).
  - (b) Loosen the split clamp assembly (44) and release the bowden cable (12) from the holder.
- (4) Release the bowden cable in the fuselage:
  - (a) Record the positions of the removed components for the installation of the new bowden cable.
  - (b) Remove the lock nut (26), the washer (25) and the bolt (23). Remove the clamp (24) from the bowden cable conduit (12).
  - (c) Remove the lock nut (30), the washer (29), the distance piece and the bolt (27). Remove the clamp (28) from the bowden cable conduit (12).
  - (d) Remove the lock nut (34), the washer (33) and the bolt (31). Remove the clamp (32) from the bowden cable conduit (12).
  - (e) Remove the lock nut (38), the washer (37) and the bolt (35). Remove the clamp (36) from the bowden cable conduit (12)).
- (5) Disconnect the EMER LDG GR handle assembly and bowden cable from the instrument panel:
  - (a) Remove the lock nuts (9) and (15), the washers (8) and (14), the safety washer (19) and the screws (7) and (20) and release the EMER LDG GR handle assembly.
  - (b) Loosen the lock nuts (18), the washers (17) and the screws (10) and release the bowden cable conduit (12).
  - (c) Carefully remove the EMER LDG GR handle assembly and the bowden cable conduit (12) from the instrument panel.
- (6) Remove the handle assembly from the damaged bowden cable:



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- (a) Pull the handle (3), the guide (5) and inner cable (13) from the mounting (21) and the bowden cable conduit (12). Discard the bowden cable conduit (12).

**NOTE:** A locking ball (6) is peened in position in the guide (5) . If the guide (5) has become worn it is possible that the locking ball (6) could be loose in the guide (5). Be careful if the guide (5) is pulled from the mounting (21), do not lose the locking ball (6).

- (b) Use a pin punch and remove the cotter spring (22) from the handle (3), the guide (5) and the locking pin (2). Discard the cotter Spring (22).

**NOTE:** Make sure the compression spring (4) and the locking ball (6) is not lost when the handle assembly is separated.

- (c) Make the bend in the end of the inner cable (13) straight.

- (d) Push the inner cable (13) through and out of the guide (5). Discard the inner cable (13).

- (7) Examine the new bowden cable:

- (a) Make sure the new bowden cable has no faults, damage or corrosion.

- (b) Put the bowden cable straight. Make sure the inner cable (13) has a smooth and free movement in the bowden cable conduit (12) .

**CAUTION:** BE CAREFUL WHEN YOU INSTALL THE INNER CABLE. DO NOT CAUSE DAMAGE TO THE TEFLON LAYER. THE TEFLON LAYER IS EASILY DAMAGED.

- (8) Install the new inner cable into the handle assembly:

- (a) Remove the inner cable (13) from the bowden cable conduit (12).

- (b) Put the inner cable (13) through the guide (5). Make sure the bent 'U' end of the inner cable (13) engages with the guide (5).

- (c) Bend the end part of the "U" on the flat end of the guide (5) to safety the inner cable (13) in the guide (5).

- (d) Assemble the compression spring (4), the locking pin (2) and the handle (3) to the guide (5).

- (e) Align the holes in the locking pin (2), the guide (5) and the handle (3). Put the new cotter spring (22) in the assembly.

- (f) Put the inner cable (13) through the mounting (21).

- (g) Make sure the locking ball (6) is in the guide (5).

- (h) Install the guide (5) into the mounting (21). Make sure the setscrew in the side of the mounting (21) aligns with the machined channel in the guide (5).

- (i) Install the bowden cable conduit (12) on the inner cable (13). Make sure the inner cable (13) has a smooth and free movement in the bowden cable conduit (12).

- (9) Put the new bowden cable and the handle assembly through the instrument panel.

- (10) Install the handle assembly and the bowden cable in the instrument panel:

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- (a) Install the screws (10), the washers (17), the lock nuts (18), and the split clamps (11) and (16) and the bowden cable conduit (12) to the mounting (21).
  - (b) Install the lock nuts (9) and (15), the washers (8) and (14), the tag washer (19) and the screws (7) and (20) and the mounting (21) to the instrument panel.
- (11) Push the end of the bowden cable conduit (12) through the aft floor panel. Make a smooth 180° route to the emergency package.
- (12) Put the bowden cable conduit (12) in the correct position along the LH lower side of the cockpit. Make sure that the route of the bowden cable has smooth curves.
- (13) Attach the bowden cable conduit (12) to the lower LH side of the cockpit:

**NOTE:** A record was made at Step F. (4)(a) of the positions of the removed components.

- (a) Install the lock nut (26), the washer (25), the bolt (23), the clamp (24) and the bowden cable conduit (12).
  - (b) Install the lock nut (30), the washer (29), the distance piece, the bolt (27), the clamp (28) and the bowden cable conduit (12).
  - (c) Install the lock nut (34), the washer (33), the bolt (31), the clamp (32) and the bowden cable conduit (12).
  - (d) Install the lock nut (38), the washer (37), the bolt (35), the clamp (36) and the bowden cable conduit (12).
- (14) Put bowden cable conduit (12) through the split clamp assembly (44) and the holder.

**G. Adjustment of the Bowden Cable**

- (1) Push the EMER LDG GR handle (3) forward.
- (2) Apply the Corrosion Preventative Compound (CPC-light) (Material No. P10-005A or B) to the free end of the inner cable (13).
- (3) Push the inner cable (13) through the clamp bolt assembly (46) on the operating lever (41). Do not tighten the lock nut.
- (4) Make sure the locking latch (43) for the operating lever (41) is disengaged, and the return spring (42) pulls the operating lever (41) fully forward.
- (5) Set the EMERG LDG GR handle (3) in the front cockpit so that it is 3 to 5 mm (0.12 to 0.20 in.) from the fully forward position. Tighten the clamp bolt assembly (46) on the operating lever (41). Make sure the position of the EMERG LDG GR handle (3) does not change when you tighten the clamp bolt assembly (46).
- (6) Do a Check of the mechanism that operates the valve, as follows:
  - (a) Pull the EMERG LDG GR handle (3) until the operating lever (41) has between 3,0 and 4,0 mm (0.120 and 0.160 in.) of movement before the locking latch (43) engages.
  - (b) Adjust the locknuts (40) and (45) on the microswitch (39) until the roller touches the cam and the microswitch (39) operates (audible click). Tighten the locknuts (40) and (45) on the microswitch (39).

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- (c) Pull the EMERG LDG GR handle (3) fully out and make sure that the locking latch (43) engages.
- (d) Push the EMERG LDG GR handle (3) fully in and make sure that the locking latch (43) stays engaged.
- (e) Release the locking latch (43) and make sure that the return spring (42) pulls the operating lever (41) and the EMERG LDG GR handle (3) to their fully forward positions.

(7) Do again Step B. Proof test of the bowden cable, then Steps H. thru J.

**H. Test of the Emergency-Landing-Gear Control**

**CAUTION:** MAKE SURE THAT PERSONNEL AND EQUIPMENT ARE CLEAR OF AREA BEFORE YOU OPERATE ANY HYDRAULIC SYSTEM.

- (1) Energize the aircraft electrical system (Ref. AMM, 24-00-00, Page Block 201).
- (2) Replenish the Accumulator (Ref. AMM, 12-10-05, Page Block 301).
- (3) Remove the air brake ground lock.
- (4) Remove the safety clips and close the circuit breakers:

AIR BRAKE (front cockpit GENERATOR BUS CB panel)  
LDG GR HANDLE (front cockpit BATTERY BUS CB panel).

(5) Do the Landing Gear Operational Test (Ref. AMM, 32-30-01, Page Block 501).

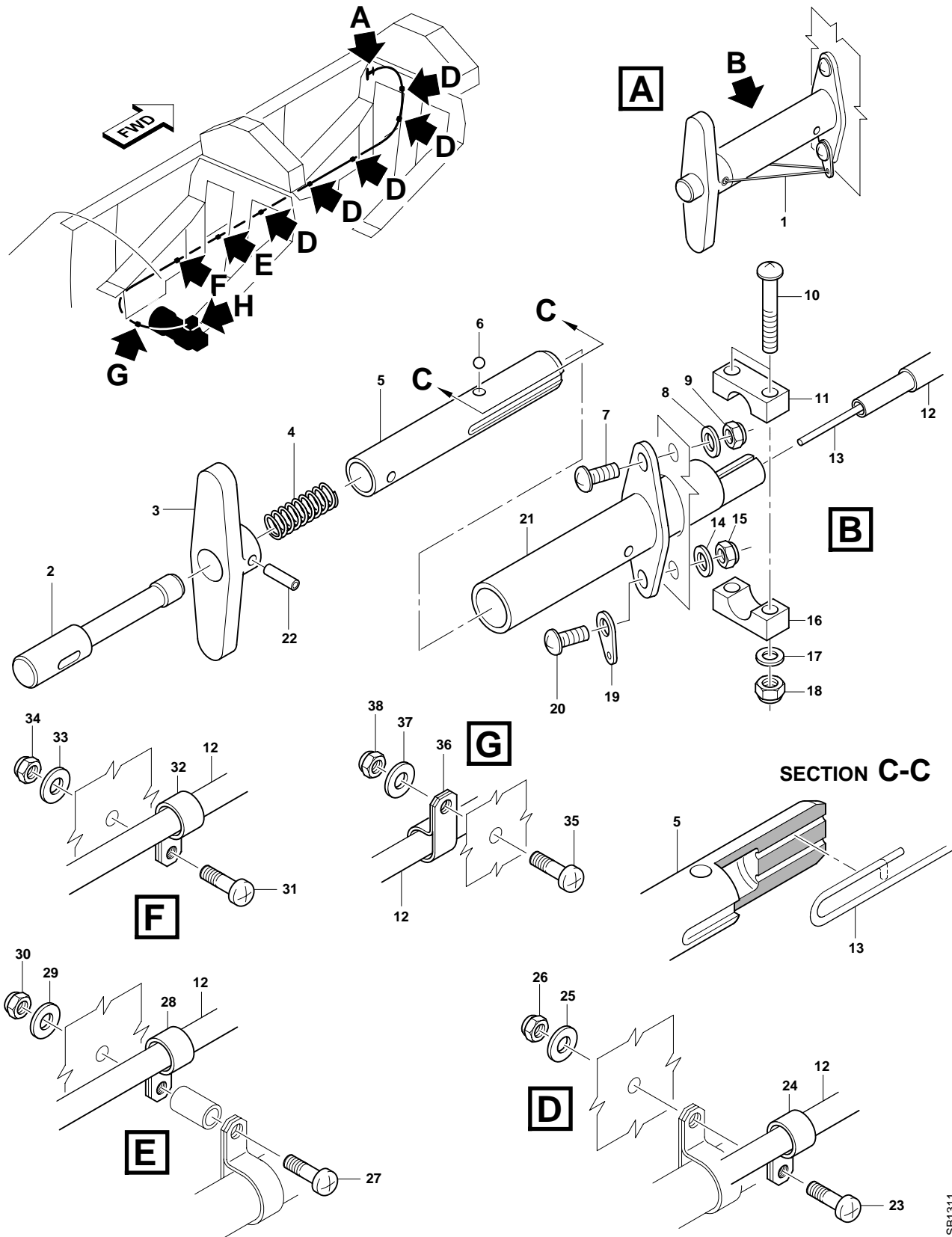
**I. Close Up**

- (1) Install the red indicating thread (Part No. 918.71.03.121) through the cotter spring (22) and the safety washer (19).
- (2) De-energize the aircraft electrical system (Ref. AMM, 24-00-00, Page Block 201).
- (3) Disconnect the rig from the aircraft (Ref. AMM, 29-00-01, Page Block 201).
- (4) If necessary, install the LH lower side panels in the cockpit.
- (5) If necessary, install the front and rear ejection seats (Ref. AMM, 25-10-01, Page block 401).
- (6) Lower the aircraft on the jacks (Ref. AMM, 07-10-00, Page Block 201).
- (7) Close access panels ENG 3L and ENG 3R, F6 and LB0 (Ref. AMM, 12-00-00, Page Block 1).
- (8) Make sure the work area is clean and clear of tools and other items.

**J. Documentation**

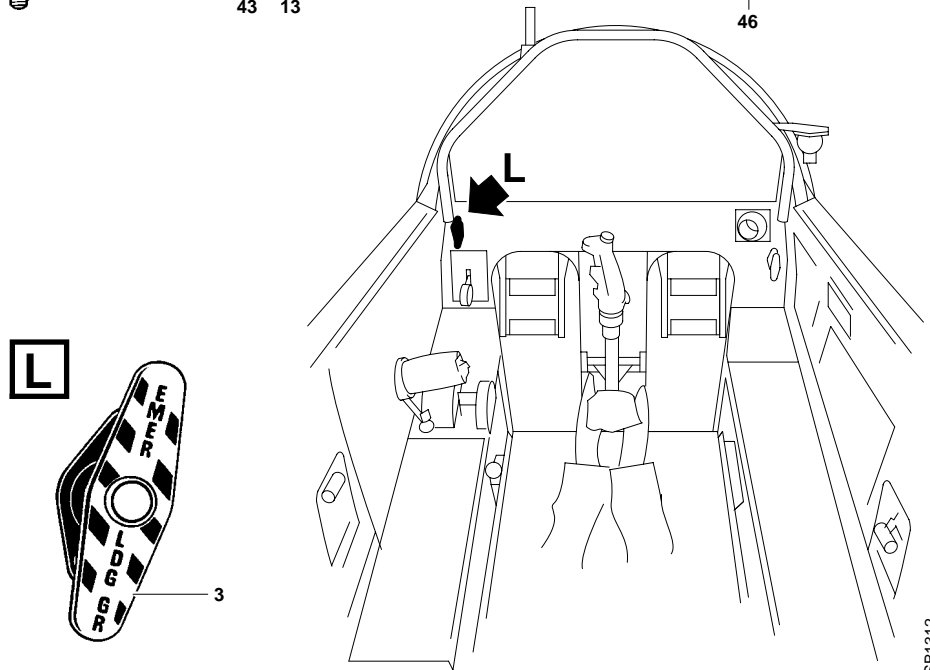
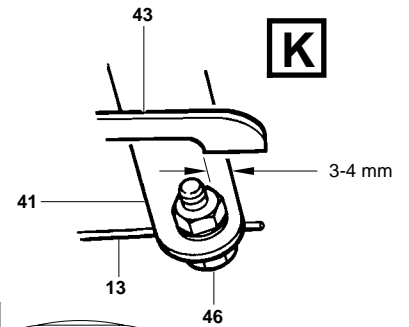
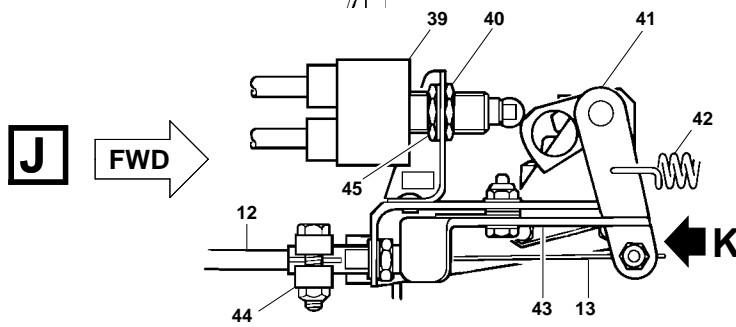
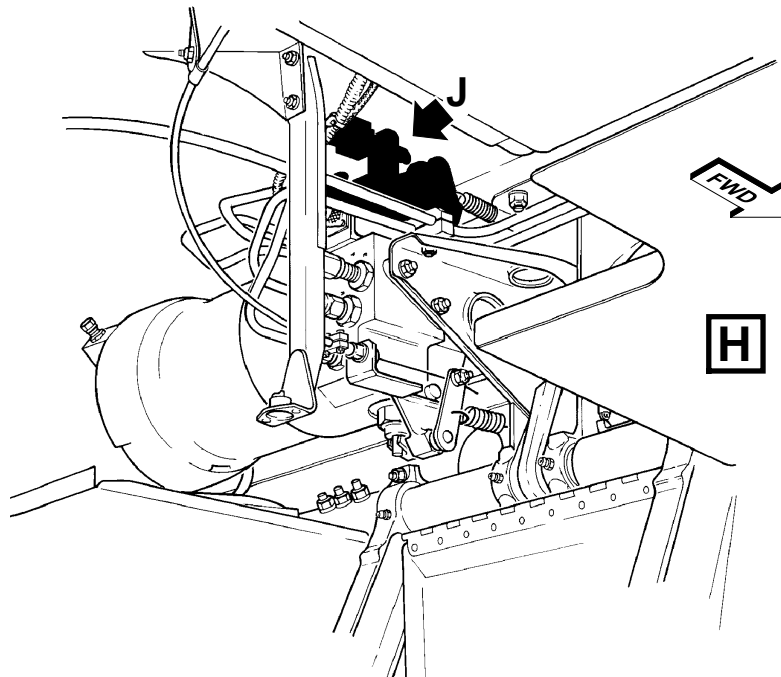
- (1) Make an entry in the Aircraft Logbook, this Service Bulletin has been incorporated.

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Emergency Landing Gear Cable - Replace  
 Figure 1 (Sheet 1 of 2)


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Emergency Landing Gear Cable - Replace  
Figure 1 (Sheet 2 of 2)