Working instruction No. 1 for TN1000/13

The new or amended text in the revised page will be indicated by a black vertical line in the right hand margin

Revision	Modification	Date	Name
1	Initial release	07.03.08	Koenen
2	Point 11 adjustment added, Point 15 part number amended	28.11.08	Koenen

Working instruction for installation of a landing gear positive locking device

All dimensions in mm, 25.4 mm = 1 inch

Required tools:

- Ratchet
- Sockets 8, 10, 13 mm
- open end spanners 8, 10 and 13 mm
- Slotted head screwdriver, philips head screwdriver
- hammer
- round bar Ø30 mm

A Work in the landing gear box

Designation of parts see maintenance manual diagram 7 and the new diagram 17 belonging to this TN.

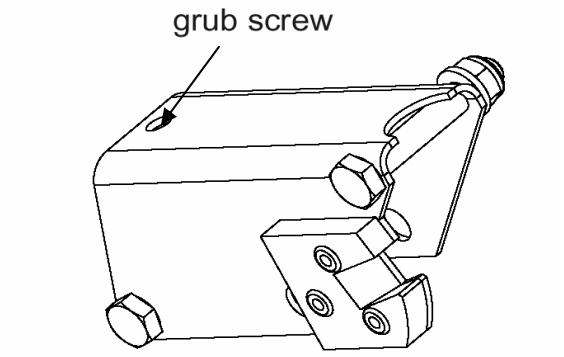


figure 1: notch

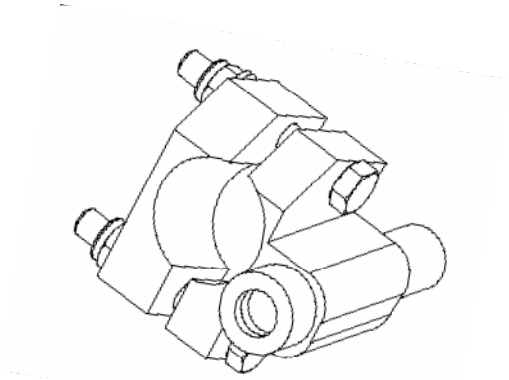


figure 2: latch

Procedure

1. Extend the landing gear but don't lock it over centre.
2. Remove the rubber cords of the landing gear doors, open and fix the doors with tape to the fuselage.
3. The forced landing gear locking device will be installed at the left struts of the landing gear. Therefore remove the bolt LN9037 M8x40 which connects the left strut 10FW14/1 to the rear fork 10FW12/2, see figure 3. (will no longer be used)

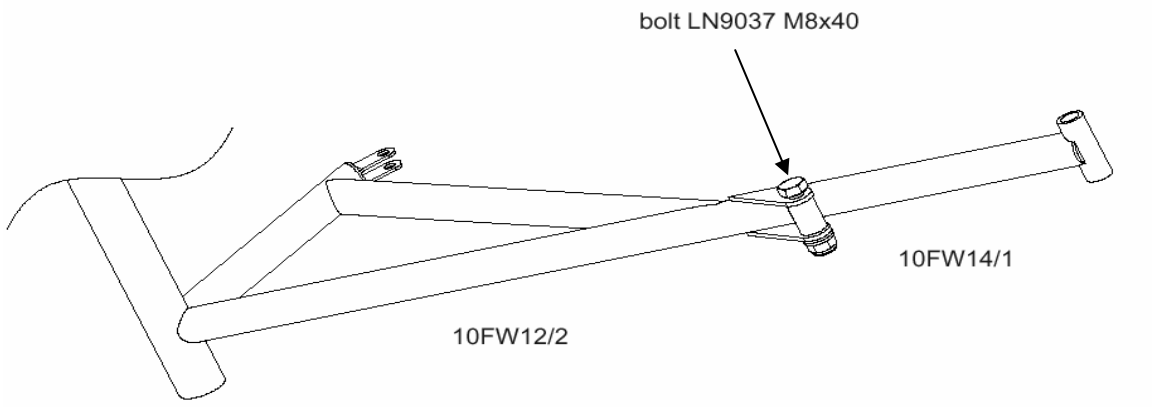


figure 3: removal of bolt LN9037-M8x40

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4. Push the notch unit over the lugs of strut 10FW12/2 and install the bolt LN9037-M8x42 from the inside to the outside according to figure 4. If a grub screw DIN913 M5x8 is already installed in the notch it must be removed.
5. Mount the hexagon 10FW84 (with eccentric borehole) into the notch unit according to figure 4. Mount all bolts from the inside to the outside.
   Extend the LG to the fully extended (over centre locked) position. Rotate the hexagon just so far that the front bolt LN9037 M6x42 of 10FW84 doesn't quite touch the tube of strut 10FW14/1 (one flat of the hexagon must be flat to the tube of 10FW12/2). Apply Loctite 243 to the grub screw and turn the grub screw into the notch until it touches the tube of 10FW12/2.

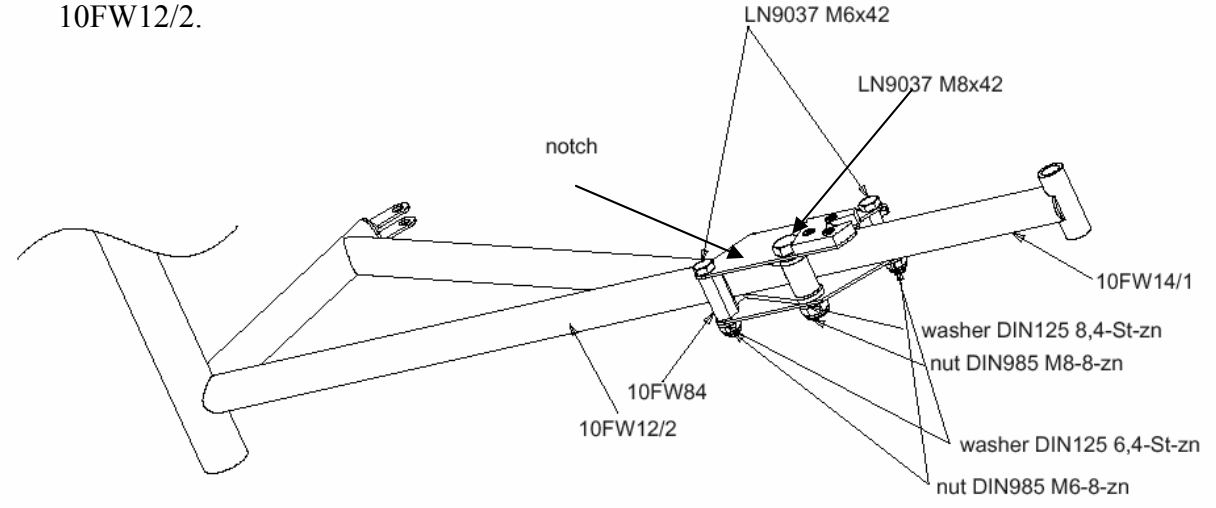


figure 4: installation of the notch

6. Retract the LG halfway. Proceed with the further steps in this position.
7. Remove the 2 bolts LN9037 M6x35 which connect the front upper fork 10FW13/1 to the shaft 10FW15/3.
8. Install the locking claw 10FW73 according to figure 5. Reinstall the 2 bolts removed under step 7 but in reverse direction (from the front to the rear).

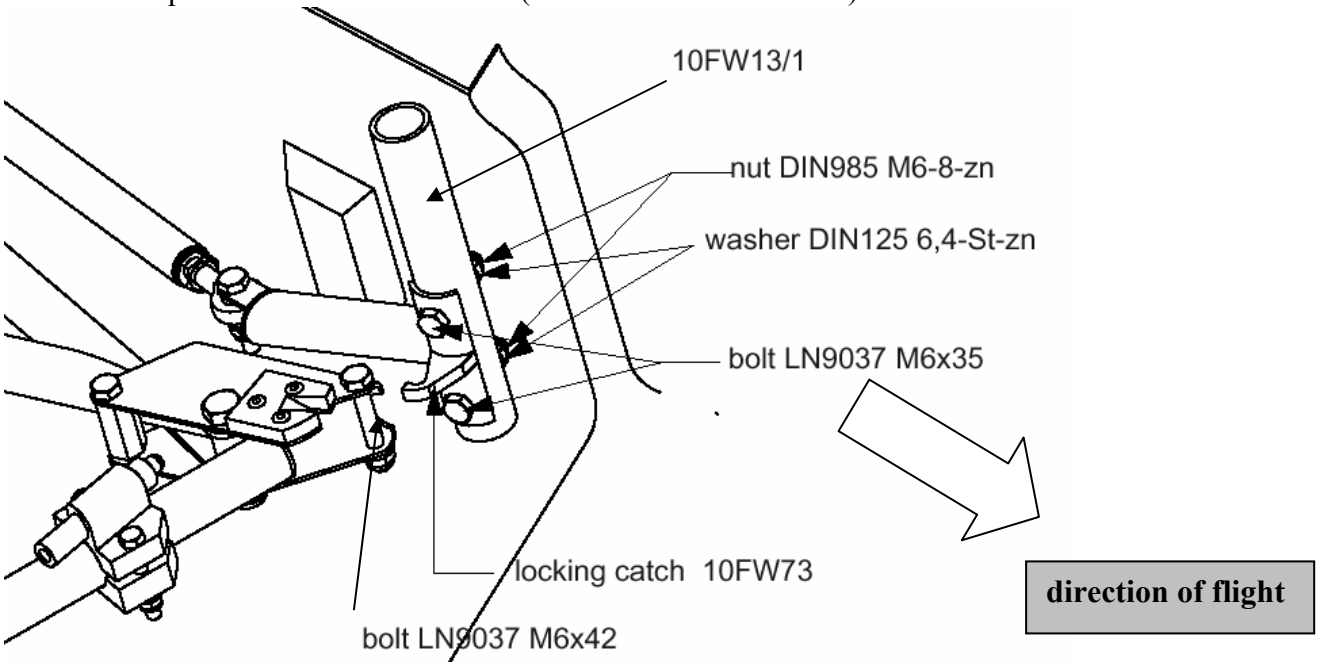


figure 5: installation of the locking catch. View LG retracted, locking catch not engaged.

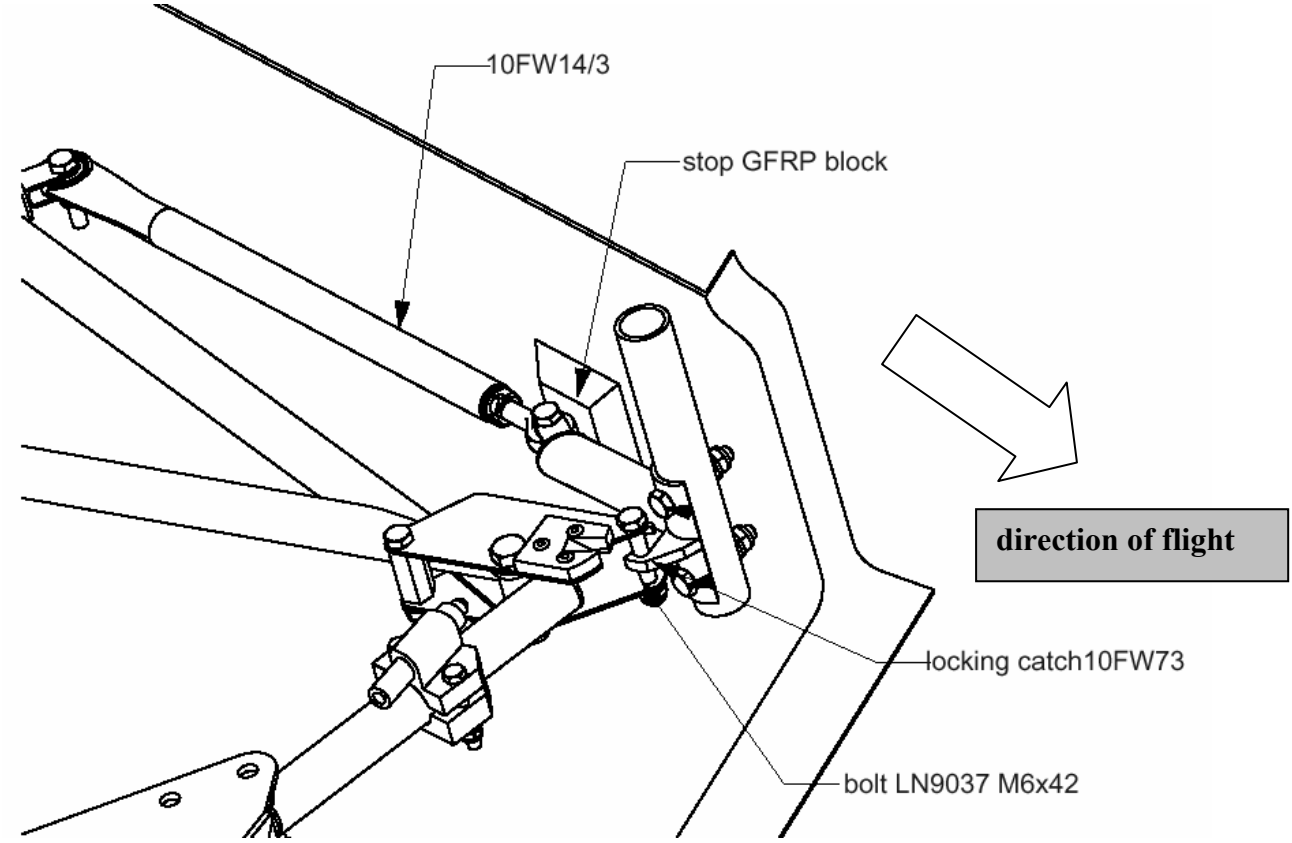


figure 6: Installation of the locking catch. View landing gear retracted, locking catch engaged.

9. Fasten the 2 bolts LN9037 M6x35 just so far that the locking catch can still be moved in its elongated holes
10. Push the landing gear at the tire into the LG box. Take care that the rear fork 10FW12/2 touches the stop block at the rear upper end of the LG box. Lock the LG (over centre locked). Take care that the locking catch 10FW73 don't damage the notch
11. Check if the locking catch 10FW73 engages with the bolt LN9037 M6x42 at the notch.. If the bolt stays below the locking catch (LG fully retracted), file off from the stop block at the rear upper end of the LG box (stop for 10FW12/2) and unfasten the rod end of strut 10FW14/3 so far that the bolt comes up high enough to enable the locking catch to engage. Rotate the catch if necessary. The distance between the bolt and the locking catch should be approx. 1 mm see figure 7.
12. To enlarge the travel of the locking catch 10FW73 you may file off some of the GFRP stop blocks (see figure 6) if necessary.
13. As soon as the adjustment is correct tighten the 2 bolts LN9037 M6x35.

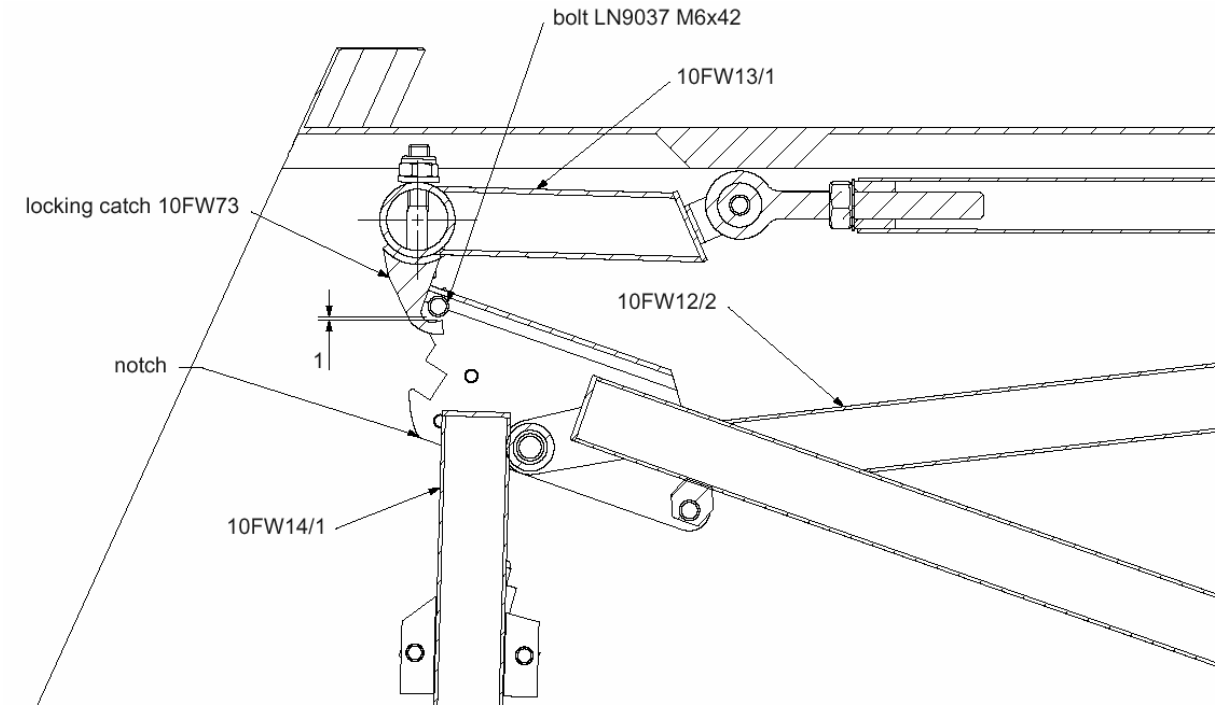


figure 7: Adjustment (Cross section through the landing gear struts)

14. Extend the landing gear completely (locked over centre).
15. Install the latch consisting of the 2 parts 10FW61 and 10FW62 which form a pipe clamp to strut 10FW14/1 see figure 8. Insert the locking pin 10FW75 with pressed in Bowden cable and the compression spring into the latch housing. Fix the cable with a clamp so that the pin can't fall out.
    Rotate the clamp so far that the latch pin 10FW75 is centred to the notch.
    Important: There should be a distance of 1 mm between the notch and the latch housing see figure 8.
    Tighten the bolts DIN931 M5x40.

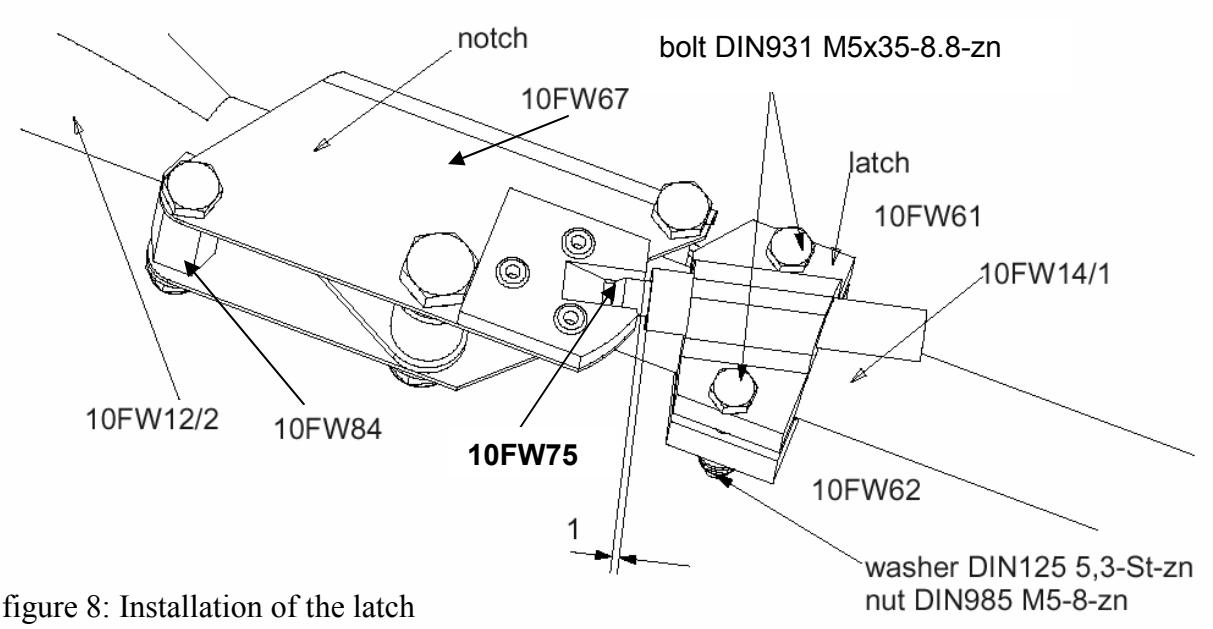


figure 8: Installation of the latch

16. Adjust the over centre lock in the retracted position according to MM section 1.6.1.2 b).
17. Reinstall and adjust the rubber buffer according to MM section 1.6.1.2 a) but adjust to 2 – 2,5 mm instead of the value 4 – 5 mm.
18. Slide a 5 mm bowden cable outer over the bowden cable.
    Length 2800 mm DG-1000T resp. 2860 mm DG-1000S.
19. Route the Bowden cable outer inside the landing gear box according to installation plan 10EP15 and push it through the foam rubber in the rear lower end of the landing gear box parallel to the wheel brake hose (see figure 18)

B Work in the landing gear box

Designation of parts see maintenance manual diagram 12 and the new diagram 18 belonging to this TN and installation instruction 10EP15.

Procedure:

1. Remove the left hand side cover in the rear cockpit
2. Remove the baggage compartment floors and the back cover
3. Measure the distance from the end of the pushrod 10FW37 to the sheet FW14/3 (=X) (see figure 9). Make a note of the measurement.
4. Remove pushrod 10FW20, spring 2St22, the guide rollers of the pushrod 10FW37 and the pushrod 10FW37. (see figures 9 and 10)

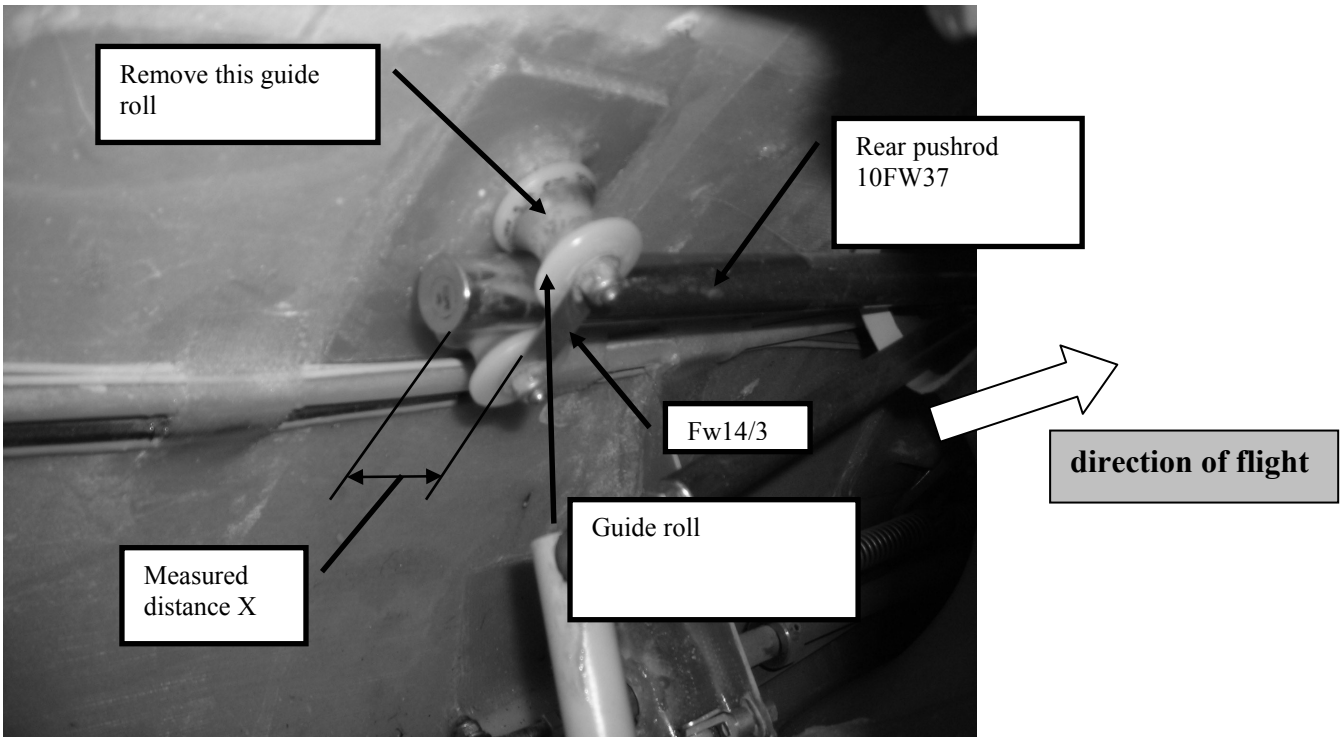


figure 9: left fuselage wall beside the landing gear box

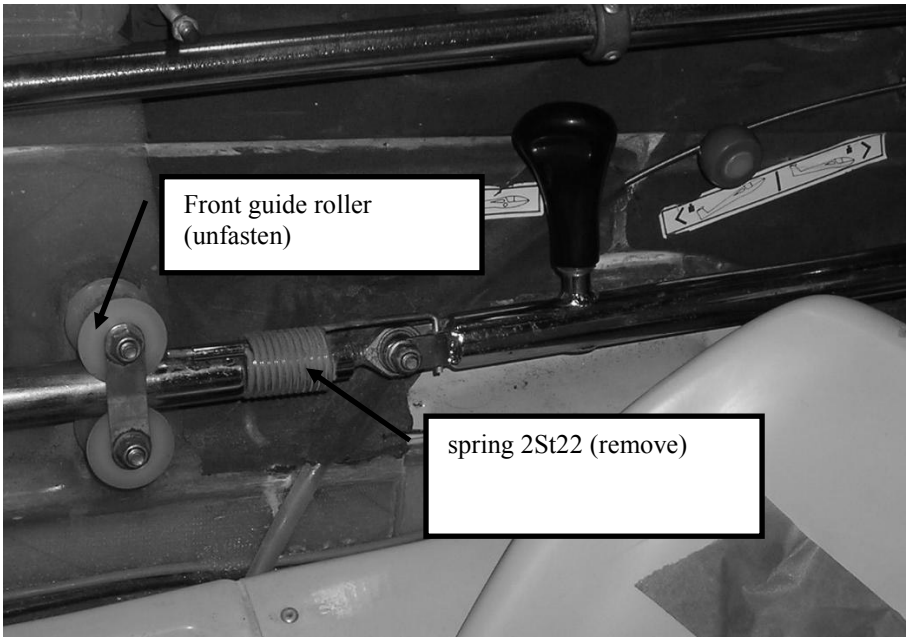


figure 10: left fuselage wall in rear cockpit

5. Cut off X-20 mm from the pushrod 10FW37 (X see 3.). Glue part 10FW65 according to fig. 11 using Loctite 638.

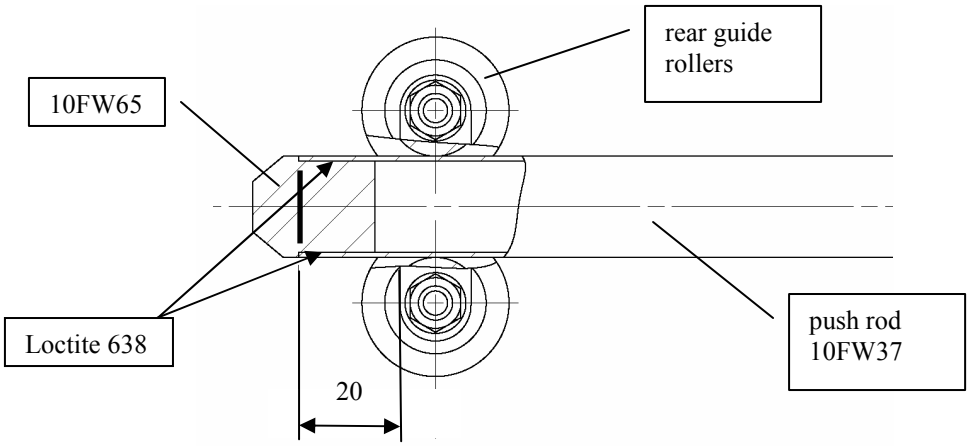


figure 11: installation of part 10FW65

6. Produce an elongated hole in the fork of pushrod 10FW20 according to figure 12.

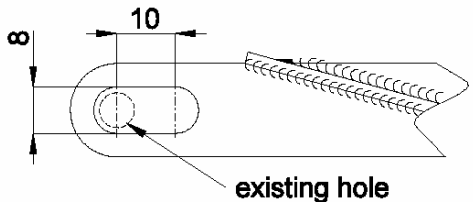


figure 12

7. Install the actuation unit 10FW77 at the stud bolt for the rear upper guide roller (see figure 13 and MM diagram 18). The existing upper roller will no longer be used.
   Reinstall the push rod 10FW37 at the same time with the rollers.
   Reinstall the connecting plate FW14/3.

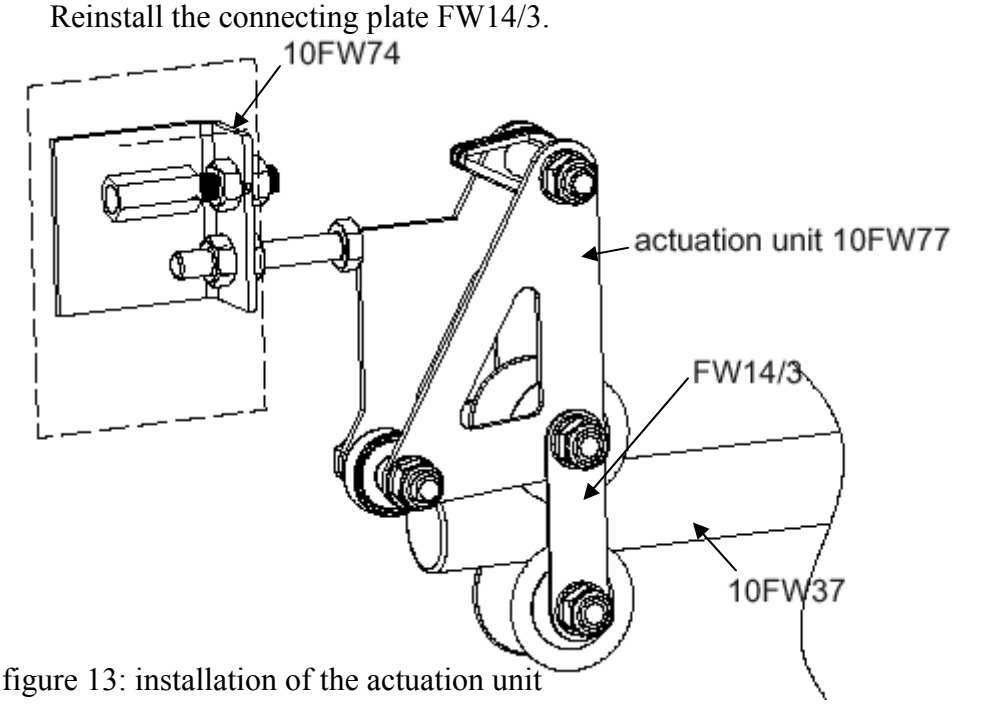


figure 13: installation of the actuation unit

8. Fasten the nuts of the front guide rollers.
9. Turn in the rod end between pushrods 10FW37 and 10FW38 (see figure 15) completely and thereafter unscrew it a half turn.
10. Deform the spring 2St22 at a vice according to drawing figures 14 and 15. New designation is 2St22/2.

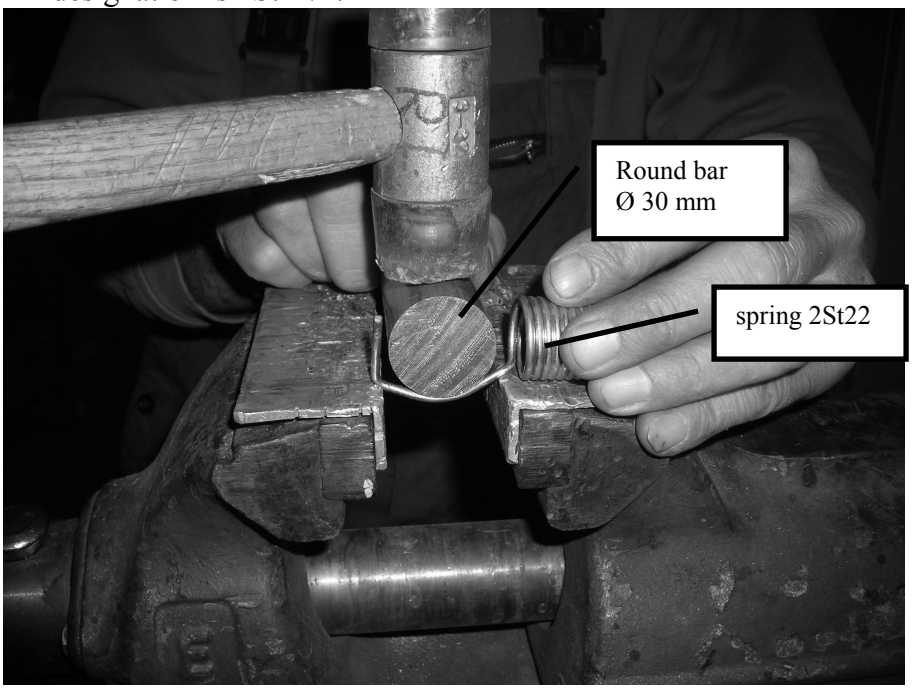


figure 14: Deforming the spring 2St22

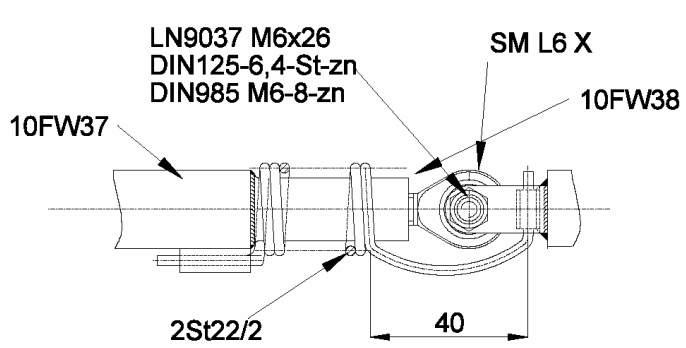


figure 15

11. Reinstall the spring and reconnect the pushrods 10FW37 and 10FW38 (see figure 15).

12. Reinstall pushrod 10FW20 according to figure 16. The existing rear bush 10FW37/2 will be no longer be used. Check that 10FW20 can be moved to both ends of the elongated hole without noticeable friction.

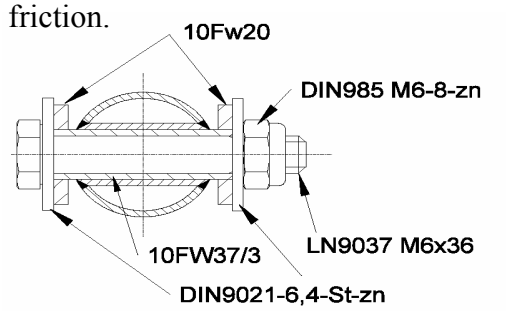


figure 16

13. Fix the bracket 10FW74 (for stop bolt and Bowden cable) to the left fuselage wall according to figure 17. To accomplish this roughen the gluing areas (fuselage and both sides of 10FW74. Mix resin L285 with hardener H286 and thicken with cotton flocks. Apply the mix to the gluing surface of 10FW74. Mix UHU Plus and thicken with cotton flocks. Position 10FW74 at the fuselage wall and apply the UHU Plus mix to the 4 edges of 10FW74. Hold 10FW74 until the UHU Plus has cured. Then fix 10FW74 with 2 layers of glasfibre fabric 92125 ±45° and resin / hardener mix L285 / H286. Let cure over night at room temperature. Then postcure for min. 18 hours at 54°C.

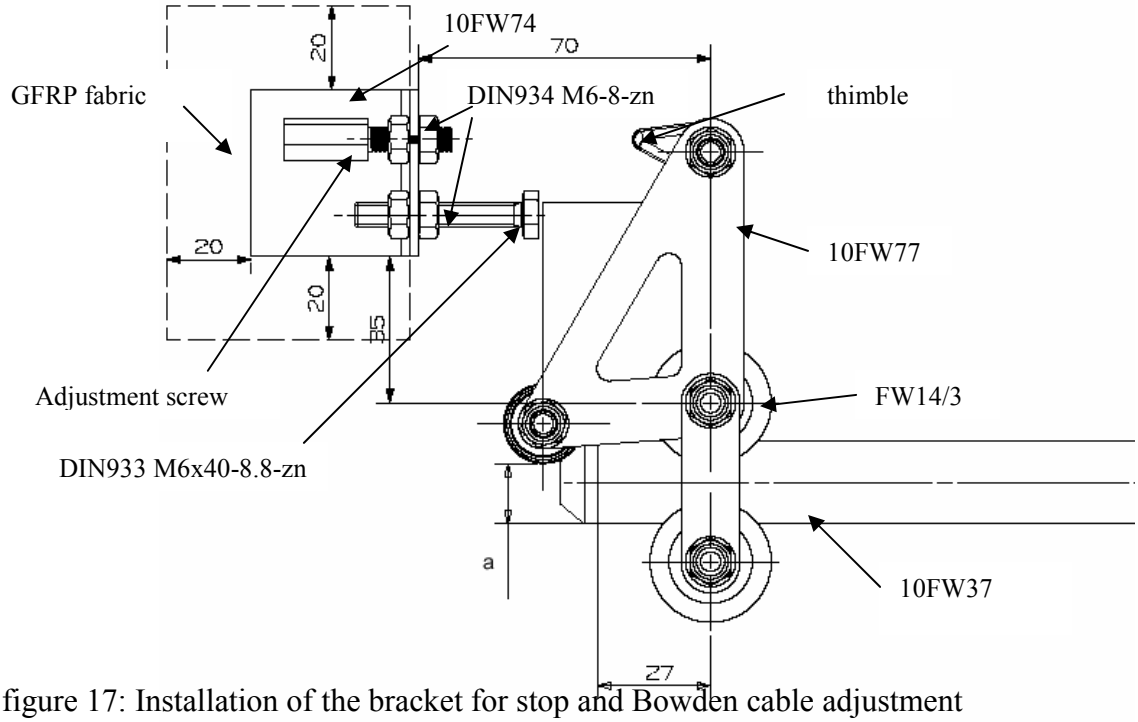


figure 17: Installation of the bracket for stop and Bowden cable adjustment

C Adjustment, final work

1. Install stop bolt DIN933 M6x40 to 10FW74. Adjust the stop (see figure 17) so that dimension a will be between 14.5 and 15.5 mm.
2. Extend the landing gear completely.
3. Install the adjustment screw to 10FW74. Insert the Bowden cable through the adjustment screw and through a Nicopress sleeve 28-1-C, lay around the thimble and insert into the Nicopress sleeve again. Pull the cable tight but not quite operating the locking pin 10FW71 (see figure 8). Mark the position. Unscrew the bolt which connects the thimble to the actuation unit, unfasten the adjustment screw, remove the bowden cable and pull it up and press the Nicopress sleeve.
4. Reinstall the bowden cable with thimble.
5. Adjust the cable via the adjustment screw so that the locking pin disengages when retracting the landing gear. The distance 1mm according to figure 8 also applies for the disengaged locking pin.
   Don't tighten the cable too much!
6. Fix the Bowden outer according to installation plan 5EP15 to the rear main bulkhead and at the left bracket 5St58/1. Remove the tape from the TY-Rap holder. Roughen the gluing areas. Mix UHU Plus and thicken with cottonflocks. Apply this mix to the holder and glue to the bulkhead.
   Secure the Bowden outer inside the landing gear box with a Ty-Rap to the wheel brake hose according to installation plan 5EP15. (see also figure 18 – 20)
   Important: Take care that the steering doesn't contact the Bowden outer in any position.
7. Reinstall the rubber cords of the landing gear doors, remove the tape.
8. Check carefully the function of the system.
9. Reinstall the left hand side cover in the rear cockpit
10. Reinstall the baggage compartment floors and the back cover

Note: The landing gear control system has now a free travel of 10 mm which is necessary to actuate the locking pin. This means that 10 mm more back-travel is needed to retract the landing gear

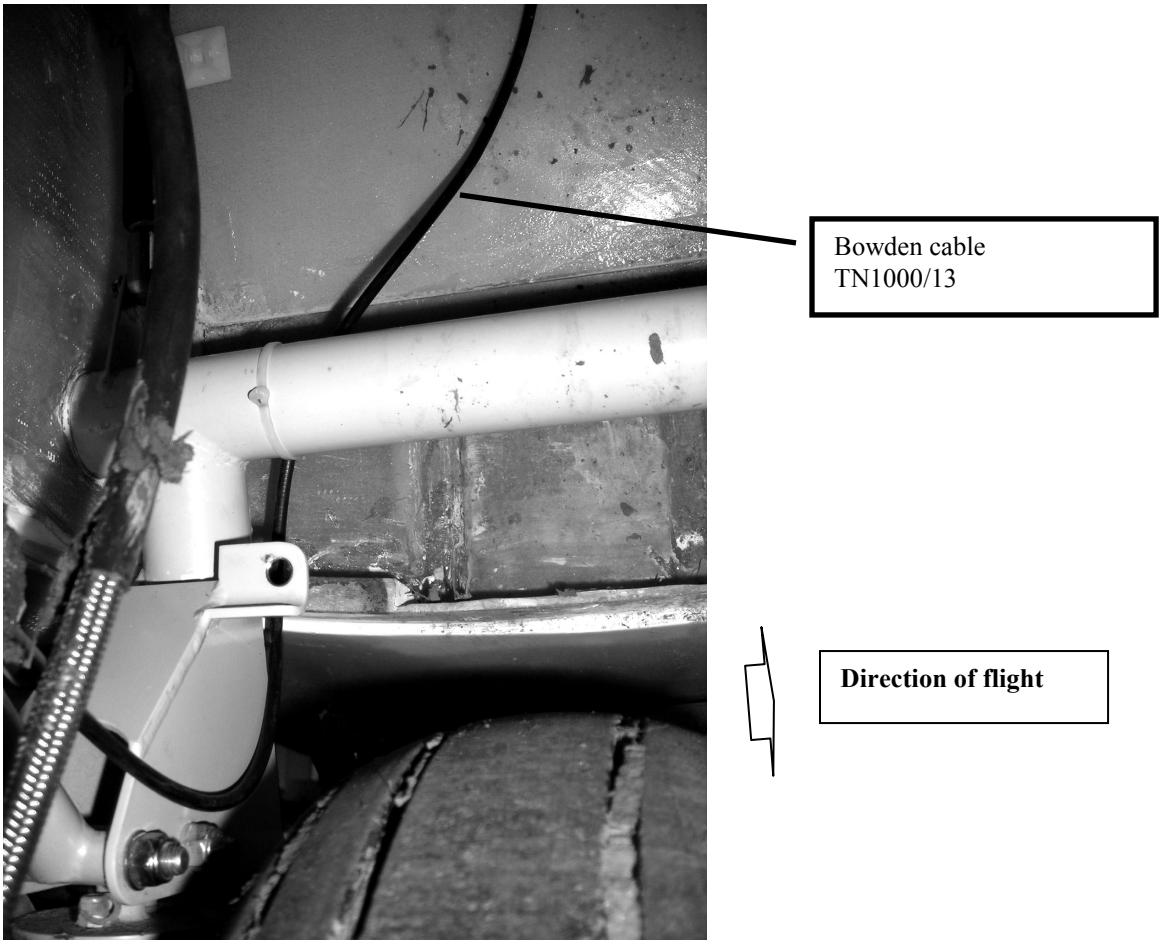


figure 18: LG extended, rubber buffer not installed

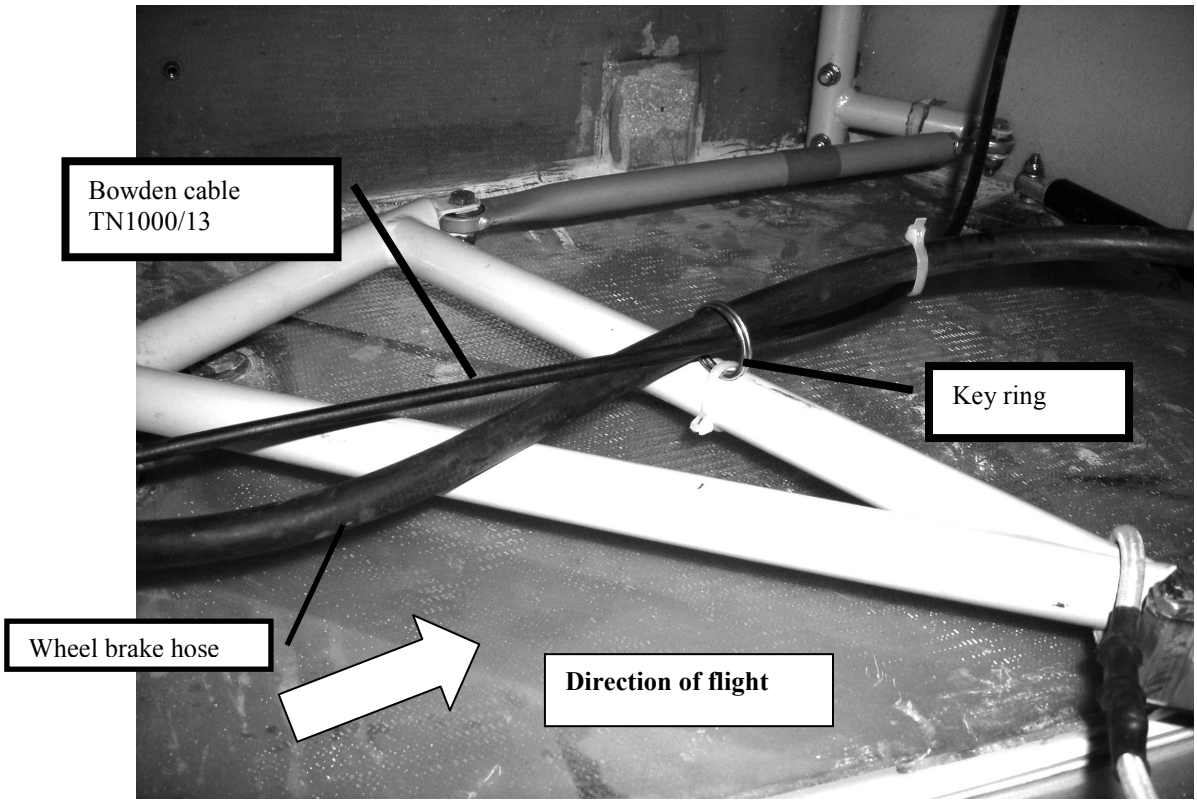


figure 19: LG extended, bowden cable installation

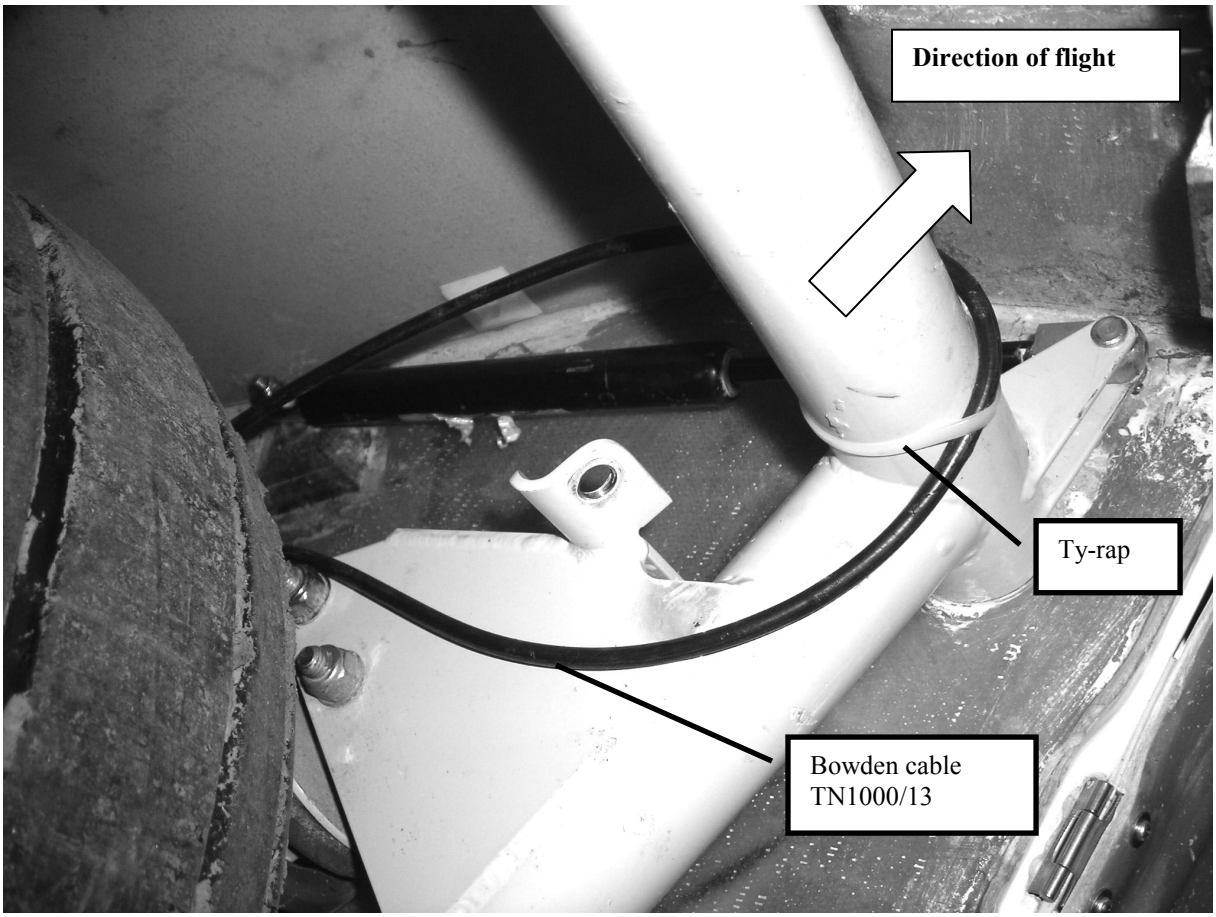


figure 20: Landing gear in the retracted position