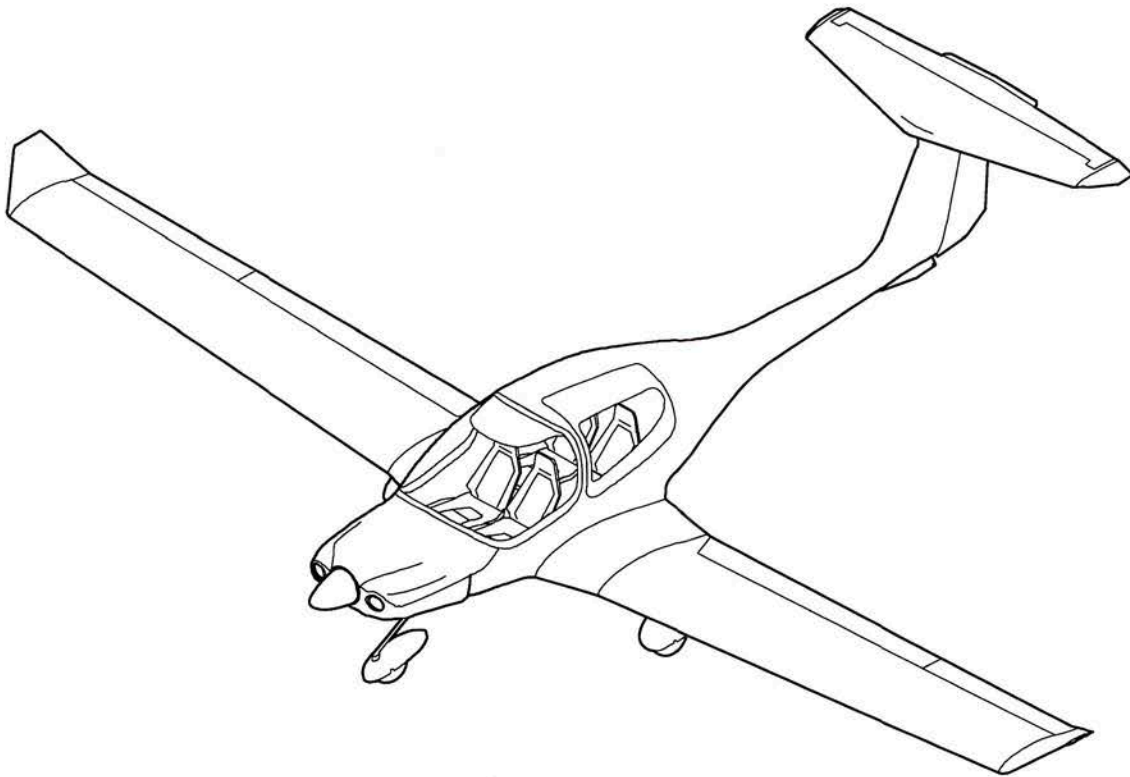


# **DA 40 SERIES**

## **AIRPLANE MAINTENANCE MANUAL**



Copyright © by DIAMOND AIRCRAFT INDUSTRIES, Wiener Neustadt, Austria.

**Section 27-38**

**Flight Controls - Elevator Trim**

**1. General**

The DA 40 has an elevator with a trim tab. The trim tab is mechanically operated. This lets you trim the airplane for different speeds and center-of-gravity positions.

A handwheel on the center console controls the elevator trim. An indicator tells the pilot the trim setting. A flexible cable moves the trim tab.

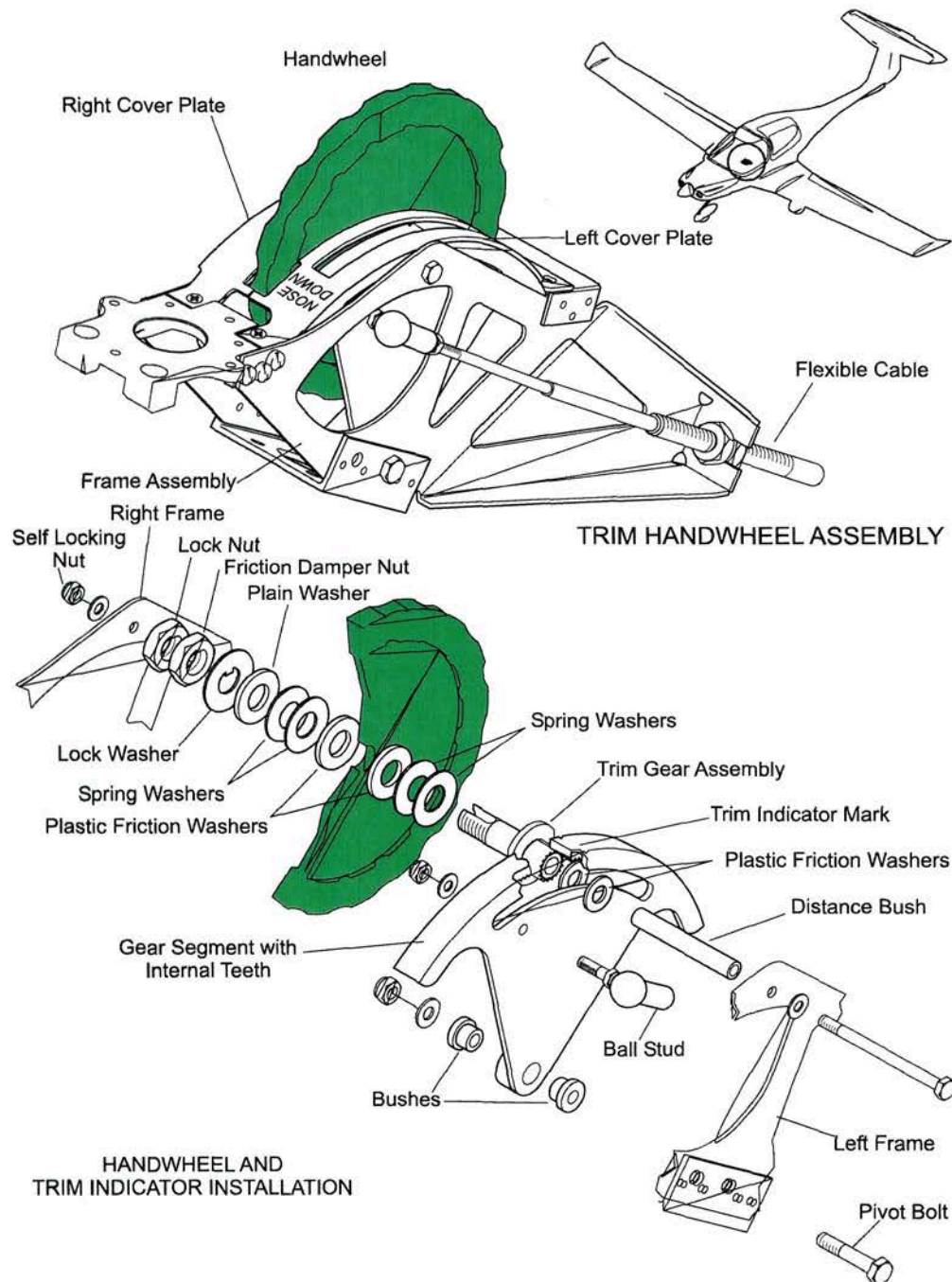


Figure 1: Elevator Trim Mechanism in the Cockpit

## **2. Description**

The trim installation has three main parts:

- A handwheel assembly with a trim indicator.
- A flexible cable which connects the handwheel to the trim tab.
- The trim tab actuator assembly.

Figure 1 shows the elevator trim mechanism in the cockpit. Figure 2 shows the trim tab actuator assembly.

### **A. Trim Handwheel Assembly**

A handwheel assembly on the center console controls the elevator trim system. The assembly has a metal mounting frame. The frame attaches to the rear of the engine control assembly and the top of the control bulkhead.

A long bolt through the mounting frame carries the handwheel. The bolt also holds friction disks, plain washers and spring washers against the handwheel. Two jam-nuts let you adjust the friction.

A small gear wheel attaches to the handwheel. The small gear wheel engages with a large gear segment with internal teeth. The gear segment has a pivot bolt at the bottom of the mounting frame. A ball-stud attaches the eye-end of a long flexible cable to the gear segment. An extension to the mounting frame to the rear makes the anchor point for the outer sheath of the cable.

The gear segment is also the trim indicator. The top face of the segment has a white line across it mid way between the front and back. The top face can be seen through a slot in the cover plate. The sides of the cover plate have markings to show the trim position.

### **B. Flexible Cable**

A long flexible cable connects the trim handwheel assembly to the trim tab. The cable goes through holes in the front and rear main bulkheads, the baggage frame and each of the ring frames. It goes up the front face of the front web of the vertical stabilizer and through a slot near the top. It goes through a large hole at the top of the rear web of the vertical stabilizer to the trim tab actuator assembly.

The cable has an inner core with threaded end fittings. Spherical end fittings at each end connect to the gear segment and trim tab actuator assembly.

Clamp blocks hold the outer core to the mounting frame at the front and a bracket from the horizontal stabilizer at the back.

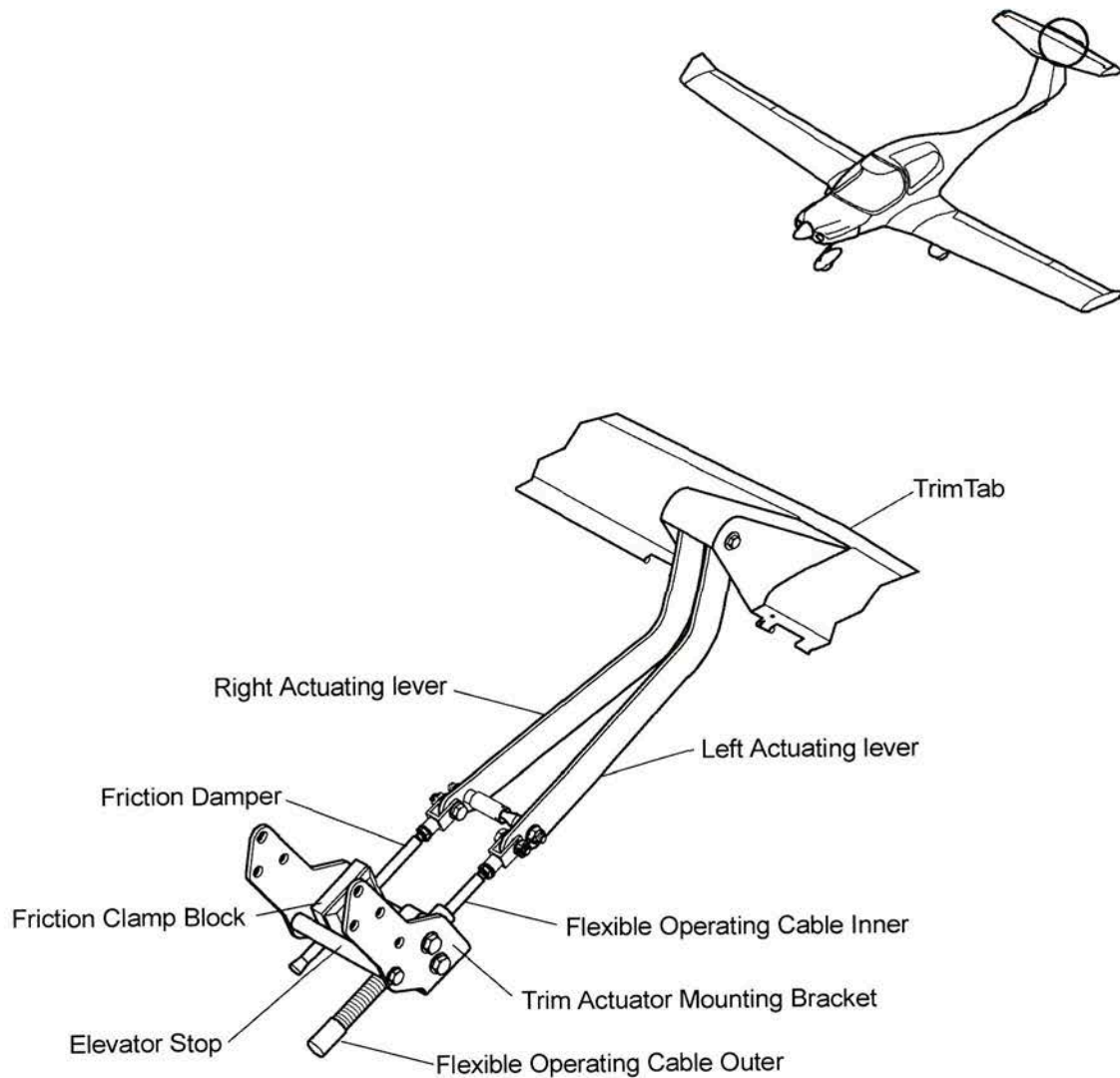


Figure 2: Trim Tab Actuator Assembly



### C. Trim Tab Actuator Assembly

The trim tab is a one-piece GFRP molding. The tab has two integral levers. Two cranked actuating levers attach to the integral levers. The left cranked actuating lever connects to the long flexible cable. The right actuating lever connects to a friction damper.

The friction damper has a clamp-block with a hole for a rod. The rod connects to the right actuating lever on the trim tab. You can adjust the friction of the rod in the clamp block.

### 3. Operation

When you move the top of the trim handwheel forward, these things happen:

- The small gear wheel moves the top of the gear segment forward.
- The gear segment pulls the inner core of the flexible cable forward.
- The inner core of the flexible cable pulls the left cranked actuating lever forward.
- The left cranked actuating lever pulls the trim tab lever forward to move the tab up.
- The up movement of the trim tab pushes the elevator down in flight giving nose-down trim.

When you move the top of the handwheel aft, the gear segment moves aft, the cable moves aft and the trim tab moves down. This pushes the elevator up and gives nose-up trim.

In each case, the pilot can see the trim position from the white mark on the gear segment.

### 4. Emergency Operation

In the event of failure of the trim control system between the handwheel and the trim actuator lever, the friction damper will prevent trim tab flutter.

## Trouble-Shooting

### 1. General

The table below lists the defects you could have in the elevator trim control system. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair in the Repair column.

Trouble	Possible Cause	Repair
Too much play in the trim system.	Worn bearings or joints.	Replace the defective items.
Trim handwheel stiff to move.	Flexible cable damaged. Trim damper incorrectly adjusted.	Replace the flexible cable. Adjust the trim damper.